Signature®

1100H+ User's Manual

Version 2012 1.0
March 27, 2012

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1991 Parkway Boulevard
Salt Lake City, Utah 84119-2026
United States of America

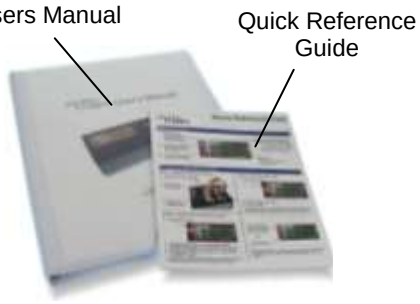
Table of Contents

Setup

Purpose of this Manual

- ❑ Tester setup
- ❑ Operator training
- ❑ Cable Testing

You will find the 1100H+ Quick Reference Guide in the front pocket of this manual. Keep this near the tester to help operators and technicians recall basic tester functions.



Cirris Customer Support

If you need assistance with your 1100H+ tester, a customer support representative is ready to assist you.

In the USA, call Cirris customer service toll-free at 1-800-441-9910. Outside the USA, enter the URL **www.cirris.com/contact.html** to find the Cirris Sales Office nearest you.

You Should Have Received

❑ **1100H+ Tester**

❑ **Probe**

❑ **USB Thumb Drive**

❑ **CTLWIN Kit**

❑ **Power Supply**

❑ **Power Cord**
Plug type varies with country of receipt.

You May Have Received

- **Adapters**
  Interchangeable adapter cards for connecting cables to the tester.

- **Scanner Add-Ons**
  Each Scanner Add-On provides 128 test points. Connect up to seven for a total of 1024 test points.

- **Networking Made Easy Kit**
  Contains the Networking Made Easy CD and network setup instructions.

Tester Options

Your 1100H+ comes standard with 1000 volt DC (Direct Current) or 1500 volt DC, depending on the model you have. Additional options are available for purchase, such as networking, scripting, SPC Data Collection, and AC (Alternating Current) capability. If you have purchased any of these options, a sticker on the back of the tester identifies the option(s) you received. Each option is described below. To add any of these options to your 1100H+, call Cirris customer service at 1-800-441-9910.

Networking

This option allows you to store test programs in a central location, easily collect test results, keep track of test programs, and make sure each tester on your production floor has access to the same test information. Additionally, you can easily back up test information to prevent it from being lost or deleted. Ultimately, operating multiple testers is more effective and time efficient with a network. To implement networking, Cirris' Networking Made Easy Kit is required.

SPC Data Collection

This option allows you to store specific test information and retrieve that information for analysis. To enable the SPC Data Collection option, see **1100 Utilities Application** on page 80. For more information, see **SPC Data Collection** on page 84.

Scripting

This option allows you to adapt the tester's behavior to fit your needs, add new features, and ease automation of tasks in the tester. Scripting can also be used to create and print custom labels for wire identification (see "Create Labels" in the Scripting manual). To enable scripting, see **1100 Utilities Application** on page 80**.**

AC Voltage

This option allows the 1100H+ tester to perform hipot tests using up to 700 VAC (RMS) on the standard 1100H+ configuration. The tester's AC hipot capacity is extended to 1000 VAC (RMS) if you have the 1500 VDC model.

Note: Special high voltage adapters are required to test at hipot voltages above 1000 VDC and 700 VAC. To enable the AC option, see **1100 Utilities Application** on page 80.

Hipot Warning!

Possible electric shock! 

Cirris hipot testers are designed to be safe for operators. Injuries from hipot test equipment are rare; however, not every hipot test situation is safe. Hipot testing is not a danger to healthy individuals, although an occasional mild electric shock may be experienced. A small shock will only occur during a hipot test when the operator touches an energized connection point. A shock from the tester may result in a hipot test failure.

Medical Warning!
A child or individual wearing a cardiac pacemaker, insulin pump, or electronically controlled medical device should NOT perform Hipot testing.

Improving Hipot Safety

- **Set Auto Hipot to OFF**

  When this option is set to OFF (see page 41), the analyzer does not automatically Hipot test. Instead, the analyzer's display prompts "Ready To Hipot" after testing for continuity and resistance. This requires the operator to manually press the Function switch or Hipot button to conduct a Hipot test. Having manual control of the Hipot test should give the operator ample time to remove their hands from any cable connections and prevent the possibility of shock.

- **Wear Rubber gloves**

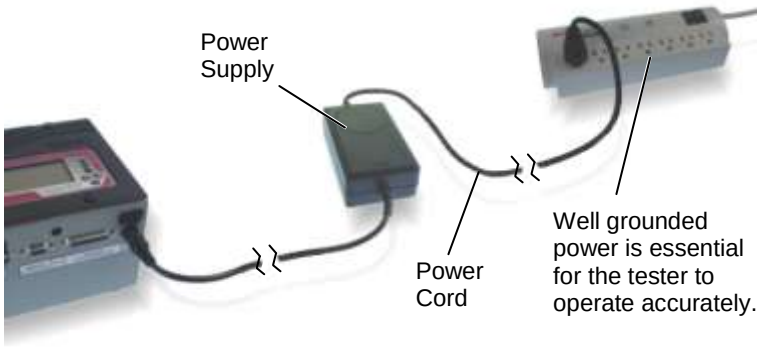
  Latex rubber gloves should be sufficient for insulating the operator's hands from electric shock. However, do not use gloves designed for electrostatic discharge (ESD). These gloves increase the potential for shock and test failures**.**

For more information on improving hipot safety visit:
www.cirris.com/testing/guidelines/hipot_safety.html

Setting up the Tester

1. Connect the power supply and power cord together, and plug the tester into a grounded power outlet.

   The power supply is capable of accepting line voltages of either 120 VAC 60 hertz or 240 VAC 50 hertz.



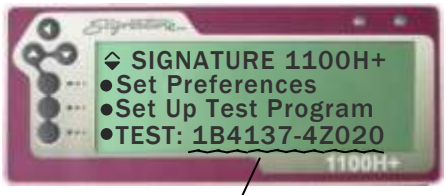
2. Connect the probe to the tester.

3. If desired, connect the thumb drive to the tester.

   On the back of the 1100H+ tester you will find two USB ports; insert the thumb drive into either port for access.

Although not required, a thumb drive allows extra storage capacity and test program mobility. A thumb drive is required to set up networking. For more information, see **The USB Thumb Drive** on page 24.

4. Turn on the tester and make sure the main menu displays.



These digits may be different, but the main screen will look similar to this.

Note: If connecting either a printer or Scanner Add-ons, see the applicable sections that follow; otherwise skip to “Tester Basics” on page 9.

Connecting a Printer

If you connect a printer to the 1100H+, you will be able to print cable documentation, error information, and test reports. Without a printer, as you go through the testing process, you will need to handwrite the results.

What printer will work?

1100 testers require a parellel printer with an Epson/Centronics style parallel port. Printers that require Windows drivers will not work. You will need a printer that is DOS compatible and capable of receiving ASCII text. You can purchase a compatible printer from Cirris. Call 1-800-441-9910 for more information.

Parallel Printer Cable

To connect the tester to the printer, you need a standard parallel printer cable available at most computer stores.

Connecting a Compatible Printer to the Tester

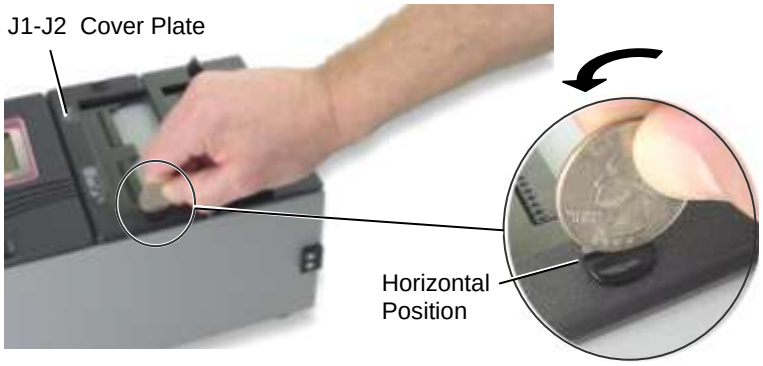
1. Make sure the tester and printer are turned off.
2. Connect one end of the parallel printer cable to the tester; connect the other end to the printer.

Caution! The 1100H+ is NOT compatible with serial printers. If you plug a serial printer into the serial port, you may damage the tester.

Installing Add-On Scanners

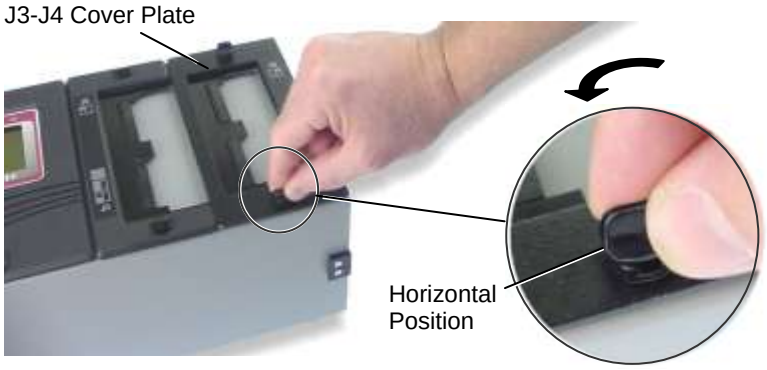
Each Add-On Scanner provides an additional 128 test points. You can connect up to seven Add-Ons to your tester for a total of 1024 points.

1. With the tester turned off, use a coin or screwdriver to turn the fasteners on the removable J1-J2 cover plate to the horizontal position.



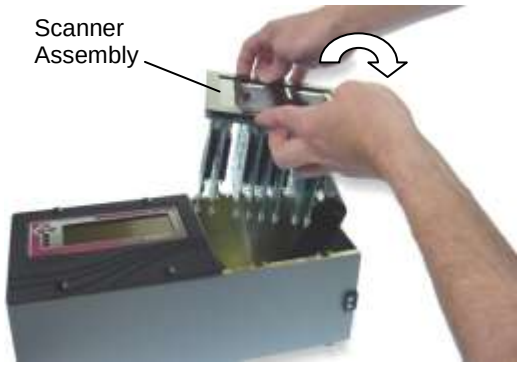
Note: The *only* time to remove the J1-J2 cover plate is when attaching an Add-On Scanner.

2. Turn the fasteners on the removable J3-J4 cover plate to the horizontal position.

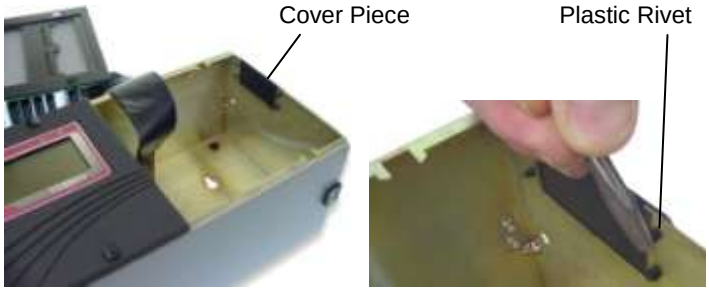


3. Remove both cover plates from the tester.

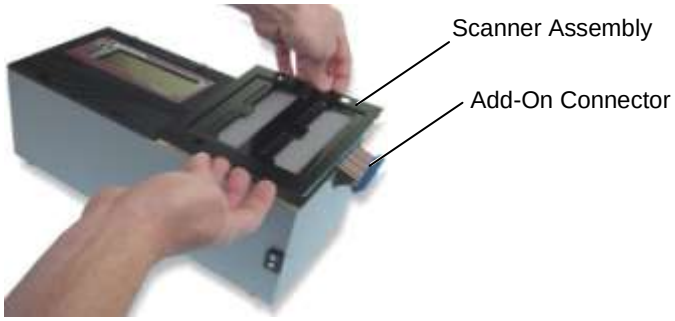
4. Carefully remove the scanner assembly, turn it upside down, and put it next to the tester.



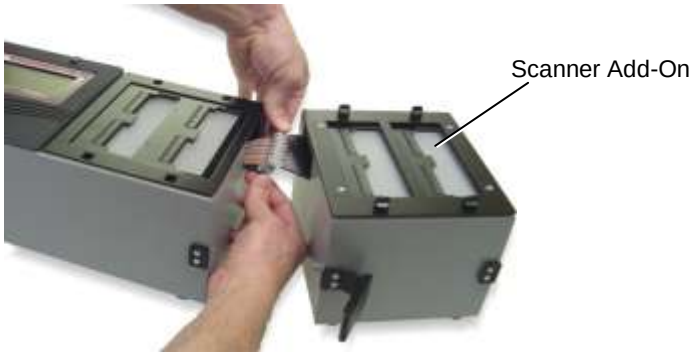
5. Remove the cover piece on the side of the tester (push out the four plastic rivets holding the cover piece in place with a screwdriver or hard flat object).



6. Carefully place the scanner assembly back into the tester. Make sure the Add-On connector sticks out to the side of the tester.



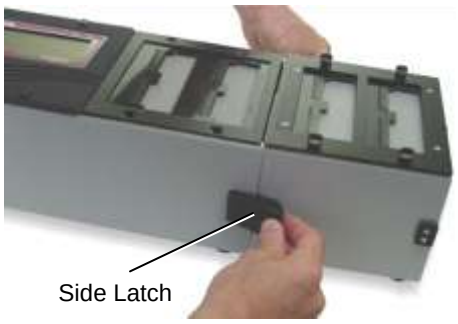
7. Mate the Add-On connectors; make sure they are fully connected.



8. Push the connectors into the main unit.

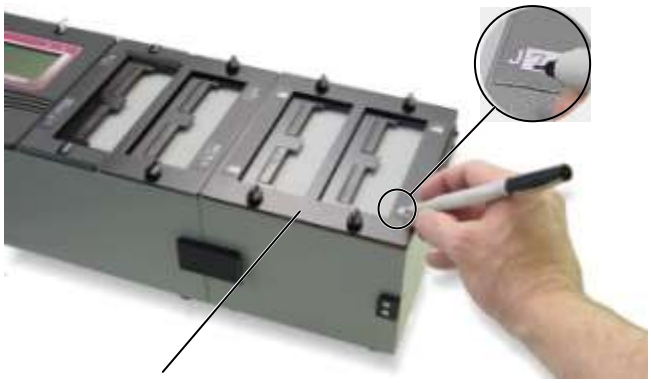
9. Attach the Add-On Scanner to the base tester using the side latches.

   If connecting more than one Add-On Scanner, repeat steps 1-8 to attach the next Add-on Scanner to the previous one.

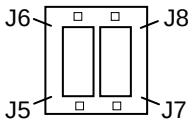


10. Re-attach the cover plates.

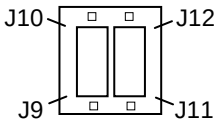
11. Label the adapter positions on each additional cover plate with a permanent marker as shown.



Label the first Add-On coverplate:



Label the second Add-On coverplate:



Continue this sequence on subsequent Add-Ons.

Note: Labeling the coverplates identifies adapter positions to help you understand tester prompts and error messages.

Tester Basics

Basic Operation

Back Button
Returns to the previous menu.

Up/Down Buttons
Scroll menu options and settings.

Selection Buttons
Select menu options.

Available Buttons
These symbols change as the available buttons on a screen become active or inactive. They show you which Up, Down, and Back buttons are active.

Good/Bad LED Lights
Green light if cable passes the test; Red light if cable has errors.

Menu Title
Always on the top line in capital letters.

Downloading Updates and Changing the Language

1100H+ testers come with the newest version of tester software when purchased; however, new software is released regularly. You can connect a computer to a tester using the serial port that comes with the CTLWIN kit, and use the 1100 Upgrade Application to update the tester software. This application can also be used to change the tester interface language if needed. English and Spanish are currently available; other languages may be available in the future. For more information, see **1100 Upgrade Application** on page 79.

Security

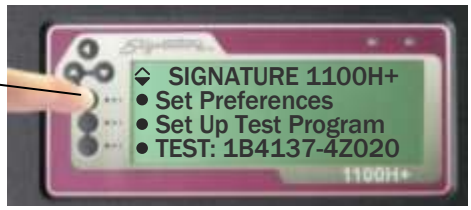
When using your 1100H+ tester, you may see a lock symbol next to a menu selection. This symbol indicates that the selection cannot be changed. By connecting a computer to the tester, you can choose to lock or to unlock certain menu selections. You may want to use this capability may be used if, for example, you wanted to keep operators from creating new test programs or changing tester settings. For more information, see **1100 Utilities Application** on page 80.

Menu Lock Symbol

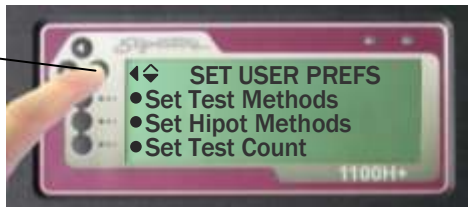
Changing the Speaker Volume

Depending on the environment where the tester is used, you may want to change the speaker volume (if additional volume is needed, call Cirris and ask about the optional Alarm Box).

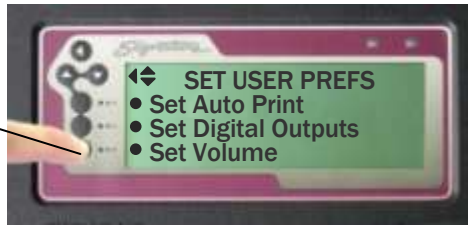
1. From the main menu, press **Set Preferences.**



2. Scroll down. ▼



3. Press **Set Volume.**

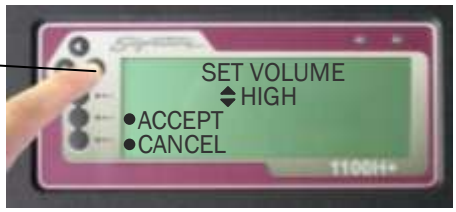


Note: If you scroll down from this screen, you can change the Date, Time, and Factory Default setting for the test.

4. Press up ▲ or down ▼ to change or turn off the volume.

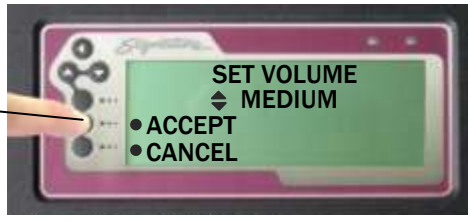
   The speaker selections are OFF, LOW, MEDIUM, and HIGH.

   As you adjust the speaker volume, you will hear audible beeps indicating the change in volume.



Need louder sounds?
If the sound selection is inadequate, you can make an adjustment inside the unit. For more information, see Changing Volume and Display Controls on page 86.

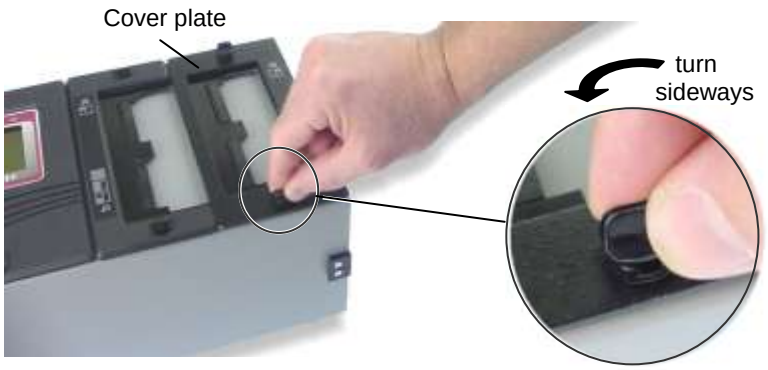
5. Press **Accept** to save the new volume setting.



6. Press back ◀ to return to the main menu.

Installing Adapters

1. Turn both fasteners on the J3-J4 cover plate sideways.

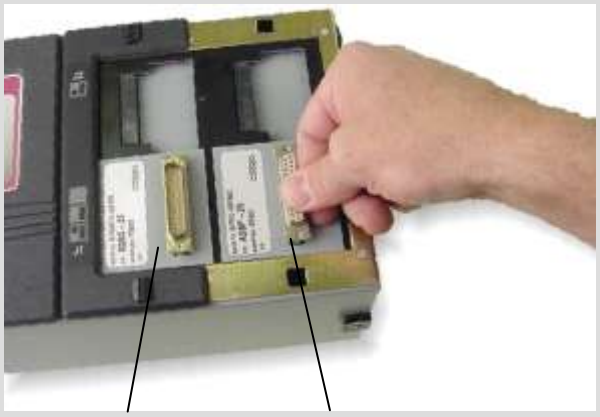


2. Remove the cover plate from the tester.

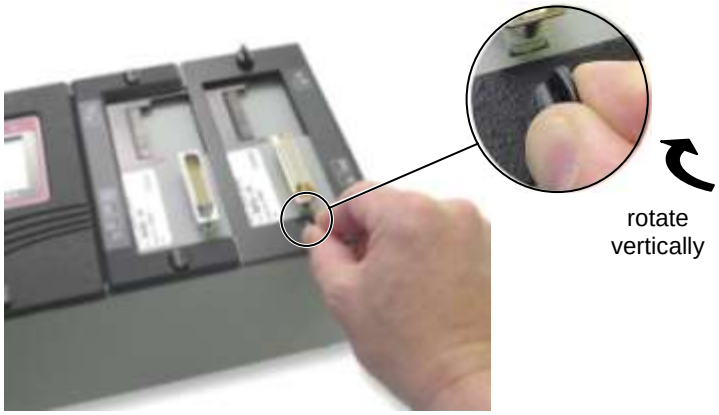
3. Slide in the adapter against the edge of the scanner until it fully seats being careful not to bend the pins!

Note: Adapters should be added with the J1-J2 cover plate in place.

Important! Make sure to first install adapters into the J1-J2 positions, and then the J3-J4 positions.



4. Reattach the cover plate and turn both fasteners to the vertical position to lock it in place.



Caution! Always use the cover plates! Without the coverplates attached, the interfacing connectors on the 1100H+ may become damaged.

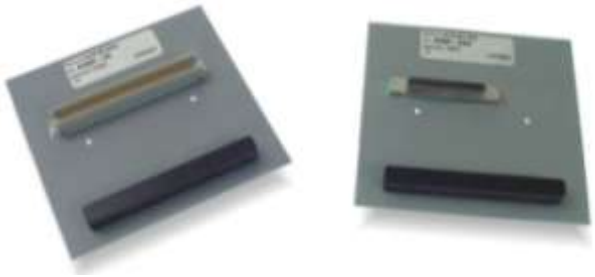
Adapter Sizes

Cirris adapters mate with many industry standard connectors. The three sizes of Cirris adapters are: Single-High, Double-High, and Quad-High.

Single-High Adapters are used for connectors with up to 28 test points.

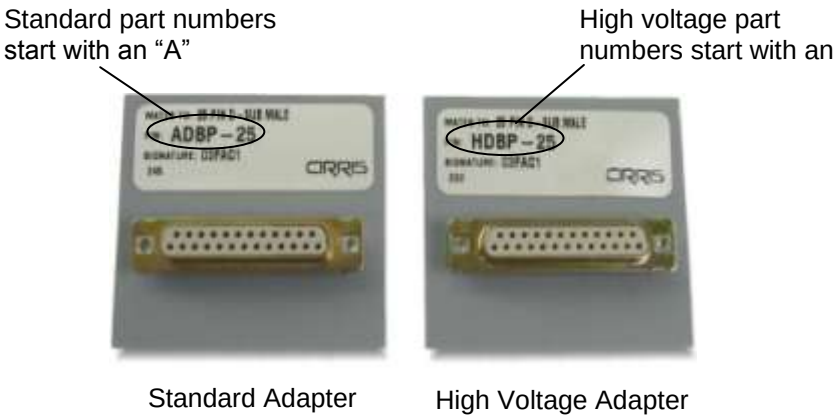
Double-High Adapters are used for connectors with up to 64 points.

Quad-High Adapters are used for connectors with up to 120 points.



High Voltage Adapters

Special High Voltage Adapters are required to do hipot testing above 1000 VDC or above 707 VAC.



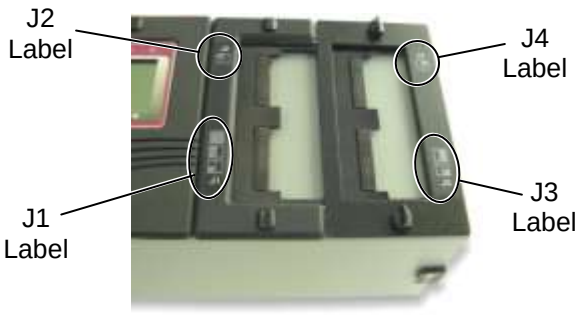
Standard Adapter High Voltage Adapter

Note: For more information on which adapters are available with an HV option, visit ***www.cirris.com*** or call 1-800-441-9910.

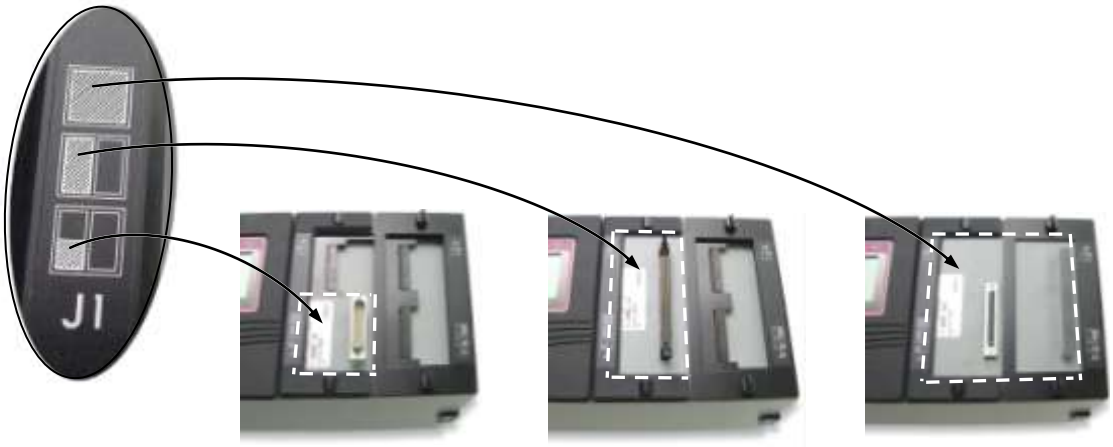
Adapter Positions

The tester recognizes positions for each adapter and refers to test points based on these positions.

Notice the J1, J2, J3 and J4 labels on the cover plates.



The J1 label shows how a **Single, Double, or Quad-High Adapter** occupies the J1 position.



Single-High Adapter in J1

Double-High Adapter in J1

Quad-High Adapter in J1

Which positions are these three adapters in?

The Single-High Adapters are in positions J1 and J2.

The Double-High Adapter is in position J3.

Duplicating the Adapter Setup

If you retrieve a test program from memory, the adapters *must be* placed in the same positions defined when the test program was created. Duplicating the adapter setup for a test keeps test results consistent.

When you begin a new test, the adapters can be placed in any available position.

When you recall the same test from memory, the adapters must be inserted in the original positions.

RIGHT
Matches the original setup.

WRONG
Does not match the original setup.

Can't remember where the adapters go?
Don't worry. If you saved the test program, the original positions will be displayed in the tester (see "Adapter Signatures" on page 17), or on the documentation used for the test.

Pins, Nets, and Net Lists

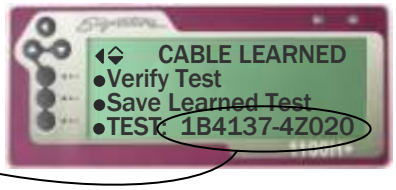
The word **pin** is generically used in this manual and in the tester interface to describe an individual contact or terminal in a connector.

An interconnection between two or more pins in a cable is called a **net**. When the tester learns a cable, it assigns each net in the cable a net number.

All of the nets for a cable make up a **net list.** In some Cirris products, the term **wirelist** is used interchangeably with the term **net list.**

Cable Signatures

When learning a cable, the tester mathematically derives an 11-digit alphanumeric code for the cable called a Cable Signature.



This code helps you quickly identify a proper test setup.

Note: If you change the name of a test program on your PC, that name will display instead of the Cable Signature.

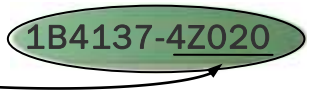
The First Part of the Cable Signature.

The first part of the Cable Signature is called the Connection Signature, which helps identify a particular cable. The tester derives the Connection Signature from:

- The wire pattern of the tested cable.
- The adapters used.
- The position where adapters are installed.

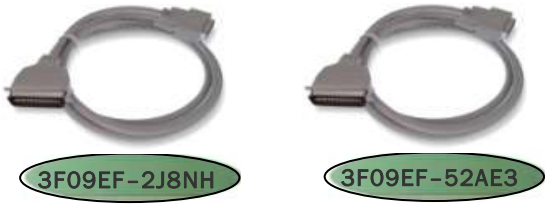
The Last Part of the Cable Signature.

The last five digits of the Cable Signature are called the Parameter Signature**,** which identifies Test Parameter Settings for the test.



Some examples

The Cable Signature for each of these cables indicates they have identical connections, but different Test Parameter Settings.



These two cables are tested with the same Test Parameter Settings, but have different connections and connectors.

Note: If a test program has components, the paramater signature is –MULTI. If a test program has advanced hipot settings or a voltage greater than 1000 V, the parameter signature is -00000.

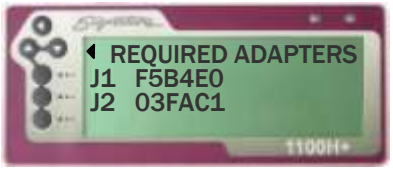
Adapter Signatures

Each adapter has an Adapter Signature. The tester uses the Adapter Signature to identify the adapter and ensure the test setup is correct.

The tester recognizes the Adapter Signature because of jumpers on the adapter pc board. Adapter Signatures identify how many pins are in the adapter, where pin 1 is, and how the pins are numbered.

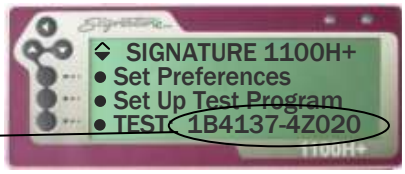
You can view the required adapter signatures in the tester by doing one of the following:

- From the main menu, press Set Up Test Program. Then press EDIT, View Other Settings, and View Adapters.
- Start a test without an adapter and press “Show Required List”.



The Loaded Test Program and Tester Memory

When you power up the 1100H+, the Cable Signature or file name of the **last loaded test program** will display on the main menu.



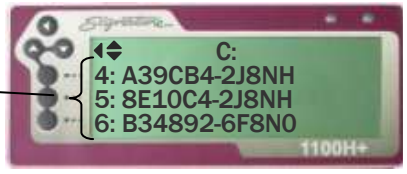
The **last loaded test program** changes whenever you:

- Learn a new cable
  or
- Retrieve a test from memory.

Internal Memory

The C drive is the tester’s internal memory and default drive. In addition to the **last loaded test program,** the C drive contains up to 99 memory locations that can store test programs.

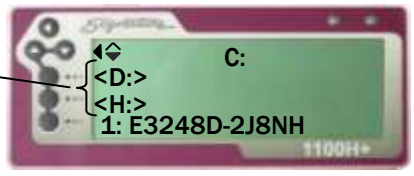
For example, this screen shows test programs stored in memory locations 4, 5, and 6.



External memory

A thumb drive is external memory, which expands storage capacity. For more information, see **USB Thumb Drive** on page 24.

If you are using a thumb or network drive, the corresponding drive letter(s) will be displayed on the screen.

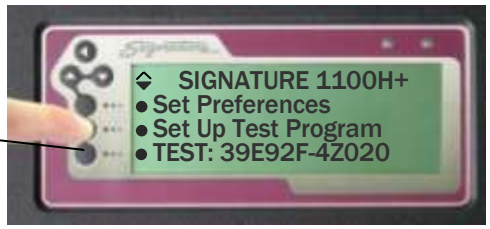


Creating a Test Program

A test program can be created by "learning" a sample cable. It is important to ensure the learned sample cable is a good cable. To create a test program from a sample cable:

1. Attach the sample cable:
   a. Remove the J3-J4 cover plate.
   b. Install the correct adapters.
   c. Replace the cover plate.
   d. Connect the sample cable.

2. Learn the sample cable:
   a. From the main menu, press **Set Up Test Program.**
   b. Press **Create New Test.**
   c. Press **LEARN.**



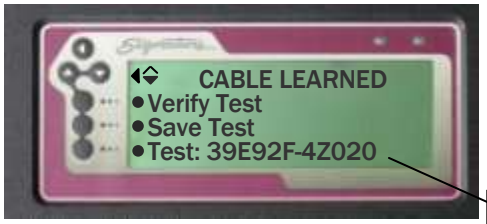
3. Verify the sample cable:

If recreating a previously verified test, do the following:

a. Make sure the new Cable Signature or file name matches the previously verified test.

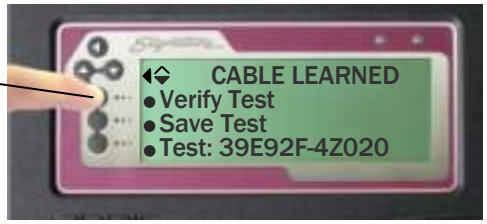
If this is the first time creating the test:

a. Press **Verify Test.**
b. Scroll down.▼
c. Verify that the learned connections match the build list of the cable exactly.
d. Double check the **Test Parameter Settings.**



1100H+ Cable Documentation

Cable Signature: 39E92F-4Z020
J1 Adapter Signature: F5B4E0
J2 Adapter Signature: 03FAC1
Connection Resistance: <Auto 5

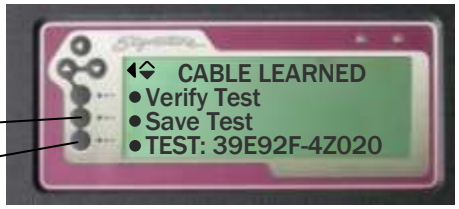


J1-003 TO J2-005
J1-007 TO J2-008
J1-013 TO J2-013

Note: If a printer is connected, you can verify by printing. For more information, see **Documenting a Test Program** on page 20.

You've created a test program!

1. Press the back button to return
   To the CABLE LEARNED menu.
2. Remove the sample cable.
3. Do one of the following:
   Save the test
   OR
   Start testing.

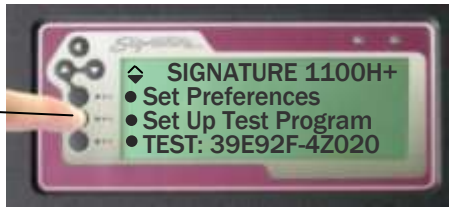


Learning a Cable With No Connections

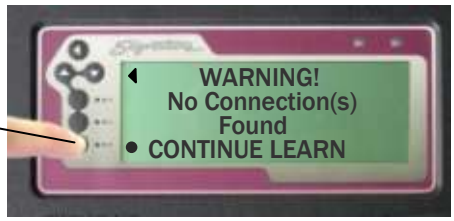
A test program can be created without connections by learning when no connections are present. This is useful when testing assemblies such as connectors or single-ended cables.

1. **Install the correct adapters:**
   a. Remove the J3-J4 cover plate.
   b. Install the correct adapters.
   c. Replace the cover plate.

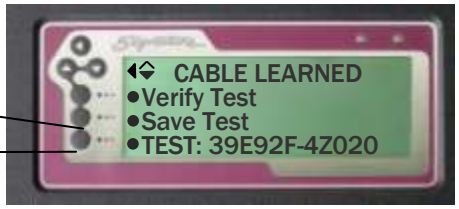
2. **Learn the test setup:**
   a. From the main menu, press **Set Up Test Program.**
   b. Press **Create New Test.**
   c. Press **LEARN.**



3. **Verify there are no connections:**
   a. Press **CONTINUE LEARN.**



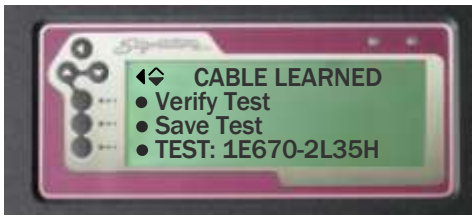
4. **The test program is ready for use:**
   a. Save the learned test
   OR
   Start testing.



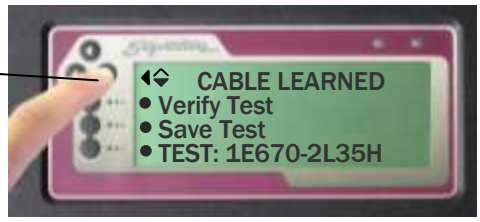
Documenting a Test Program

It is important to document a test program to know what the program is and where it is located. To document a test program:

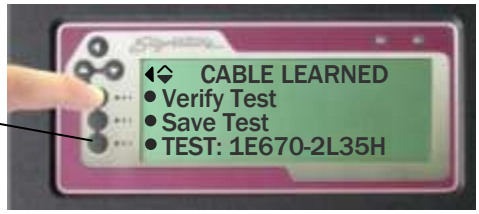
1. Create a test program as described in the previous section.



2. **If a printer is connected,** print the results:
   a. Scroll down ▼ to view the print option.
   b. Press **Print.**



   If a printer is *not* connected, transcribe the results:
   a. Press **Verify Test.**
   b. Scroll down, ▼ and record the information on an **1100H+ Cable Documentation Form** (blank form in appendix).



Testing a Cable

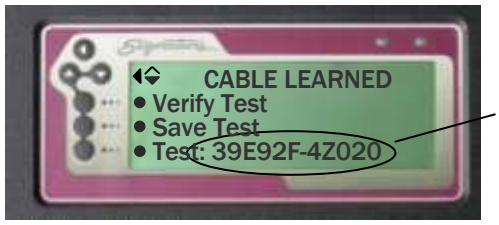
1. **Make sure the test program for the cable being tested is loaded:**

   Load a different test program by:

   - Creating a test from a sample cable

   OR

   - Retrieving a test from memory.



The **last loaded test program** is displayed on the main menu after learning a cable.

2. To duplicate the adapter setup from the original test, do one of the following:

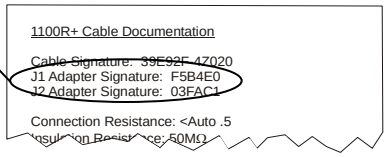
Adapters set up in original positions

   a. Refer to the documentation used for the test,

   or

   c. Press **Test** for the loaded test program.

   d. Press **Show Required List.**



3. **Attach the cable to be tested and start the test.**

   a. If you have not done this already, press **Test** for the loaded test program.

   b. Attach the first cable to be tested.

Note: If the User Preference **Test Mode** is set to CONTINUOUS, the test will start automatically. If **Test Mode** is set to SINGLE TEST, press START TEST to begin the test. For more information, see **Test Mode** on page 39.

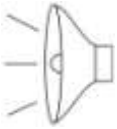
The cable is tested.
The tester performs a low voltage test on the cable. If it passes, the tester (with factory default User Preferences) automatically starts the hipot test. If it passes the hipot test, the tester (with factory default User Preferences) will start the intermittent test. The tester performs the intermittent test by repetitively performing a low voltage test on the cable until the cable is removed or the test run is ended.

If you would rather press a button to start the hipot test, change the User Preference **Automatic Hipot** to OFF. You can turn off the hipot part of the test by changing the Test Setting **Hipot Test** to OFF. For more information, see **Overview of Preferences & Settings** on page 32.

If the User Preference **Test Mode** is set to SINGLE, the tester will *not* perform the intermittent test.

If the cable passes:

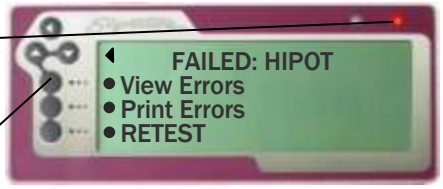
- The green LED will light up.
- The screen will display PASSED ALL TESTS.
- If the **Test Mode** is set to CONTINUOUS, the tester will automatically scan for intermitants and emit a **Tick Tick Tick …** sound.

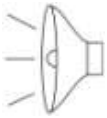


Each tick signifies a good low voltage test of the cable.

If the cable fails:

- The red LED will light up.
- The screen will display the type of error.
- You can press **View Errors** to see the detailed error message.
- The tester will sound an error tone, based on the type of error.





Single Beeps = open
Two Beeps = short
Three Beeps = miswire
Three Beeps = high voltage error

For more information, see **Cable Error Messages** on page 65.

4. **Remove cable from the tester**

When the cable is removed, the screen will prompt you to attach the next cable.

Note: If the screen does not display the ATTACH CABLE prompt after removing the tested cable, it means the tester still sees conections. Check your adapter or adapter cables for shorts.

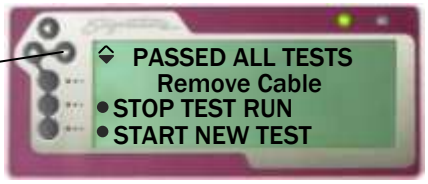
Test Summaries

A test summary displays the results of a batch of tested cables.

Displaying a Test Summary

After testing a good cable:

1. Scroll down. ▼
2. Press **Get Summary Count.**

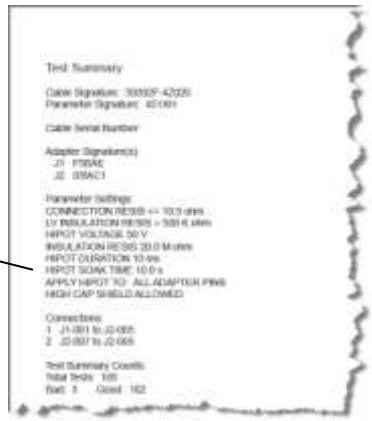


This screen shows the test summary counts for the total number of tested cables and the number of good and bad cables tested.

If you have a connected printer:

- Press here to print the test summary.

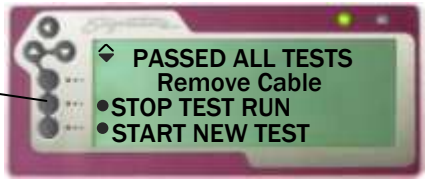
The printed test summary shows the cable signature, parameter signature, cable serial number, adapter signature(s), parameter settings, connections, and test summary counts for a batch of tested cables. If desired, attach the printed test summary to the tested cables to substantiate the test results of the batch.



Note: You can change the format of the test summary to display the count for *good cables* only. For more information, see “Test Count” on page 42.

To Clear or Reset a Test Summary

When finish a run of cables, and have the summary data you need, press **STOP TEST RUN** to complete the run. The summary counts (Total, Good, and Bad) will be reset to 0 in preparation for another run.



Using the Probe

The probe can determine the pin count, identify
flying leads, and locate cable errors in the test cycle. When you probe a point in a net, the tester initially displays up to six test points of the net. For large nets, you may have to scroll down to view all points of the net. The first listed test point is not always the test point the probe is touching.

USB Thumb Drive

Cirris has supplied you with an external storage device, commonly referred to as a thumb drive. All 1100H+ testers released after August 1st, 2008 are equipped with USB ports. If your 1100H+ was released at an earlier date, contact your Cirris representative for upgrade information.

The thumb drive allows you to do the following:

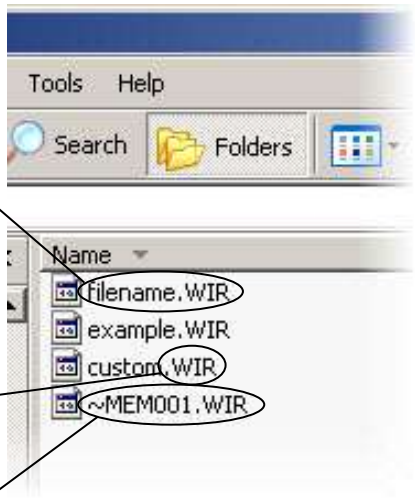
- Backup test programs.
- Copy test programs between 1100 testers
- Copy test programs between the tester and a PC

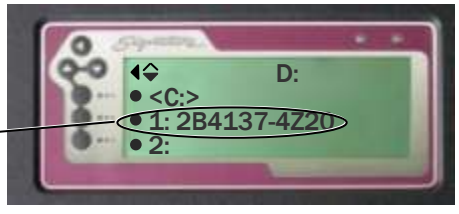
Custom File Names for Wirelists

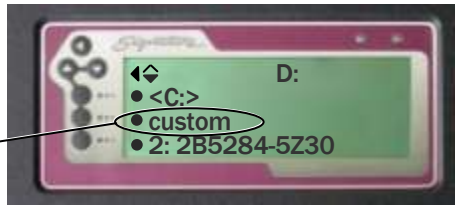
When you copy test programs to your PC via thumb drive, you can rename your wirelists with custom file names and then copy them back to the tester.

How file names function:

- If you copy wirelists to the tester via thumb drive, custom file names longer than eight characters will be truncated. The first six characters will display followed by a right arrow and a number. For this reason, Cirris recommends keeping custom file names to eight characters or less. To view custom file names up to 16 characters, you can compress your files with Cirris' compression utility; see **1100 File Compression Utility** on page 82.
- File names MUST be followed by **dot (.) WIR** for the test program to appear in the tester.
- If you choose not to rename a wirelist that is copied to your PC, the file name will be based on the memory location you saved it in. For example, a test program saved in memory location 1 will be ~MEM001.WIR; in memory location 2 it will be ~MEM002.WIR and so on. In the tester, the name will again appear as the cable signature in the memory location that the file name indicates on the PC.
- In the tester, custom file names will no longer be in a memory location. They will display above the list of memory locations.





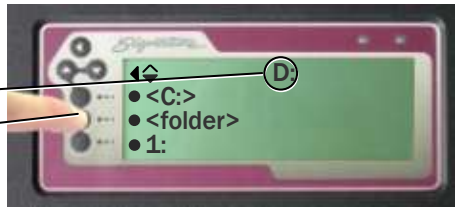


Creating Folders

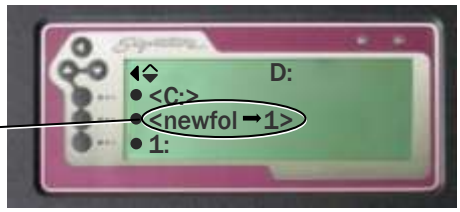
On your PC, you can organize test programs into folders and then copy the folders into the tester via thumb drive.

How folders function:

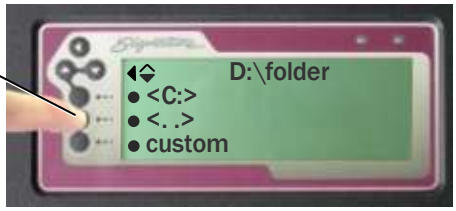
- If you copy a folder to the tester, it will appear on the tester screen after you select the thumb or network drive letter. Press the folder's button to view the files in the folder.



- As with file names, folder names longer than eight characters will be truncated in the tester. The first six characters will be followed by a right arrow symbol and a number.



- After you select a folder, you can press the button next to this symbol **<. .>** to take the screen up one folder level.

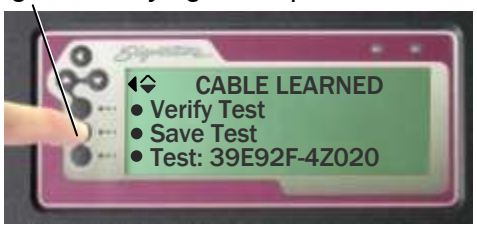


Managing Test Programs

Saving test programs speeds up test setups and eliminates the need to maintain “known good” sample cables to reprogram the tester. You can load saved test programs, delete unwanted test programs, and copy test programs from one location to another. You can also import wirelists/scripts that have been compressed using the 1100 File Compression Utility.

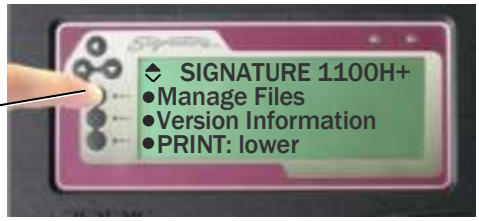
Saving a Test Program

You can save a test program after learning and verifying a sample cable…OR after editing a test program…

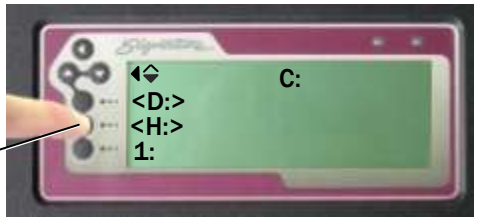


Saving the Loaded Test Program

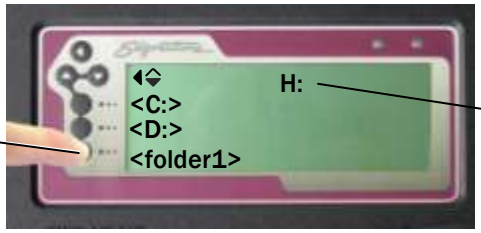
1. From the main menu, scroll down.▼
2. Press **Manage Files.**



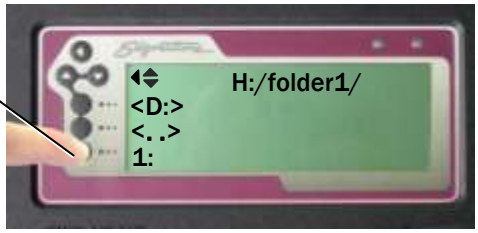
3. Press **Save.**



4. Select the following:
   b. A drive letter
   c. A folder
   d. A memory location



The selected drive is displayed here.

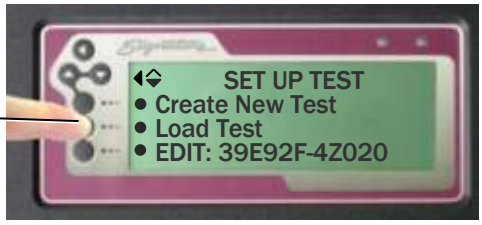


Note: Selecting a memory location saves the test program in the tester.

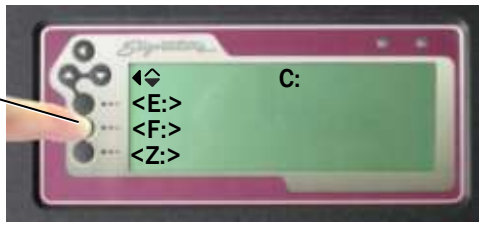
Note: Cirris recommends recording the test program information on the **1100H+ Cable Documentation** or **1100H+ Test Program Location Listing** form (blank forms in appendix).

Loading a Test Program

1. From the main menu, press **Set Up Test Program.**
2. Press **Load Test.**

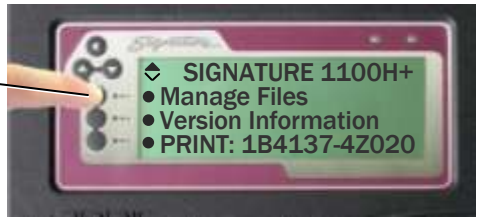


3. Select the drive letter and folder where the test program has been saved.
4. Select the test program you want to retrieve to make it the loaded test program.

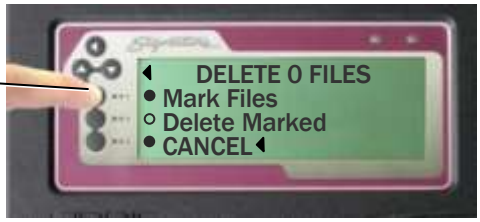


Deleting a Test Program

1. Return to the main menu.
2. Scroll down ▼ and press **Manage Files.**

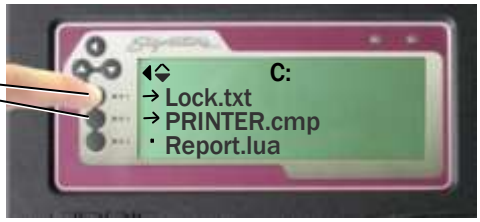


3. Press **Delete Files.**
4. Press **Mark Files.**

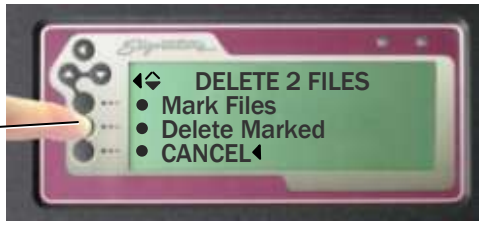


5. Press the buttons next to the files you want to delete (arrows indicate that a file is marked for delete).

   Use the **1100H+ Test Program Location Listing,** or other documentation, to verify the correct test program to be deleted.



6. Press the back button.
7. Press **Delete Marked.**



Importing Compressed Wirelists/Script Files

You can only import wirelists or script files if you have used the “1100 File Compression Utility”. Before attempting to import your files, see “1100 File Compression Utility” on page 82.

1. With your thumb drive plugged in, scroll down from the main menu, and press **Manage Files.**

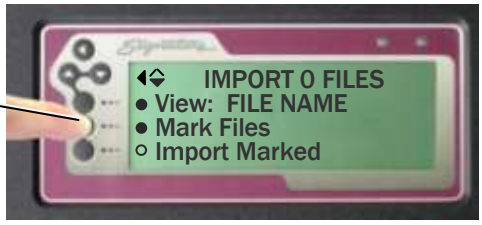
2. From the “Manage Files” screen, scroll down and press **Import Files.**

3. You can press the View button to view your compressed wirelists by name or by content.

   - **FILE NAME**
     This option will display the name of the bundled file as a .ccb file or for the single file as a .ccf file.

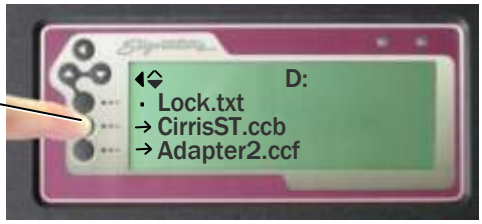
   - **FILE CONTENT**
     This option will display all files in the bundle or the single files.

4. Press **Mark Files.**



5. Select the **D:** drive and press the buttons next to the bundle or file you want to import (right arrows indicate that a file is marked for import).

   Use the **1100H+ Test Program Location Listing,** or other documentation, to verify the correct test program to be imported.



6. Press the back button.

7. Press **Import Marked**.

Note: Your compressed wirelists will now be in the tester’s **C:** drive.

Using CTLWIN

Included with your tester is the CTLWIN kit, which contains a software install disk and a PC interface cable. CTLWIN is a PC Windows program, which allows you to access Test Programs in the tester's memory. Using CTLWIN you can:

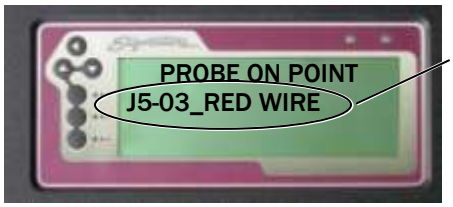
- Copy/move test programs between an 1100H+ and a computer
- Create custom point labels
- Edit, create, and organize test programs on a computer
- Create links and define components

For installation instructions and PC requirements to run CTLWIN, refer to the Cirris Software Installation Guide.

Common Uses for CTLWIN

Copy Test Programs
If you have multiple 1100H+ testers, you can create a test program on any tester, and use CTLWIN to copy the same test program to other testers.

Replace Default Point Labels with Custom Point Labels (Test Point Labeling)
Using CTLWIN, you can create custom point labels to reflect actual point names, wire colors, or other assembly instructions. Custom point labels may be up to 16 characters.



Edit Component Values and Tolerances
The 1100H+ can test diodes, resistors, and capacitors. When learning these components, the 1100H+ measures the value and automatically sets a 10% default tolerance. With CTLWIN, you can edit the component value and the tolerance.

Create Links and Component Definitions
If the tester senses a component, but cannot identify the component as a resistor, diode, or capacitor, the tester creates a "link" in the test program to ensure no high voltage is applied across the component during the hipot test. You can use CTLWIN to change a link to the appropriate component command. For more information, see **Components Learned and Tested** on page 59 and **Links** on page 60.

Running the CTLWIN Software

1. Connect the PC interface cable between the 1100H+ serial port and the PC serial port, or USB port with the Keyspan adapter.

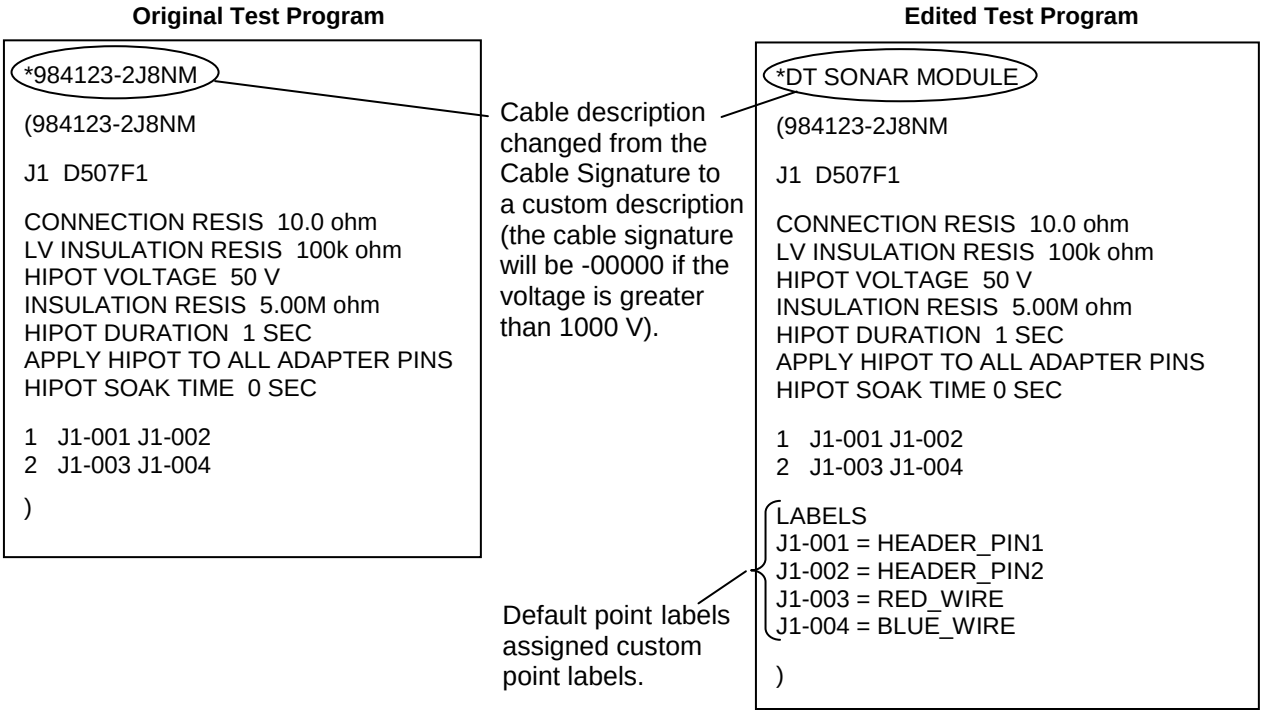
If your PC does not have a serial port, Cirris has qualified a USB Serial Adapter from Keyspan. You can purchase this adapter directly from Cirris or from other commercial sources. If you choose to purchase another make or model, we have discovered many other USB converters do not work with our equipment. This adapter has consistently performed without difficulties.

2. Click on the CTLWIN icon to begin the program.

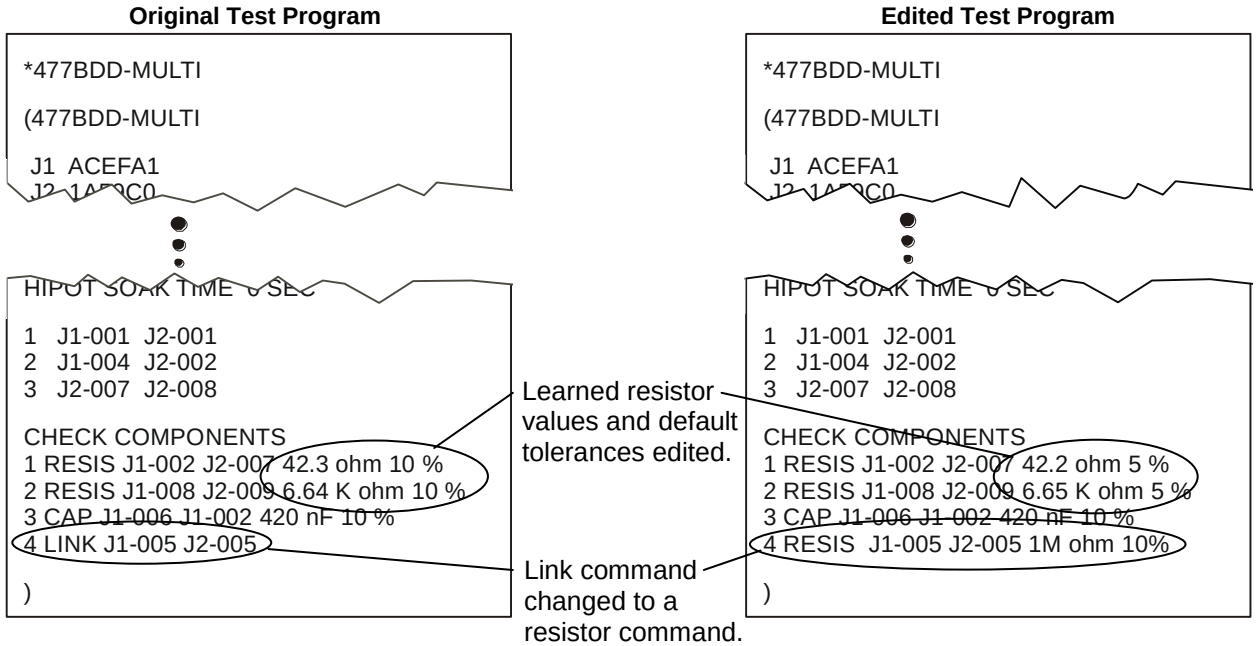
Editing Test Programs

The following examples illustrate how to edit test programs using CTLWIN.

Example 1: Changing Default Cable Description and/or Point Labels



Example 2: Modifying Component Test Values and Links



Example 3: Adding Components Not Learned

Original Test Program

```
*695BAE-MULTI

(695BAE-MULTI

 J1  ACEFA1
 J2  1A59C0

WIRE LIST SIGNATURE:69D075-A58M0
INSUL TEST PARM SIGNATURE:21
                    .
                    .
                    .
HIPOT SOAK TIME 0 SEC

1   J1-001  J2-001
2   J1-004  J2-002

CHECK COMPONENTS
1 DIODE J1-007 J2-008

)
```

Edited Test Program

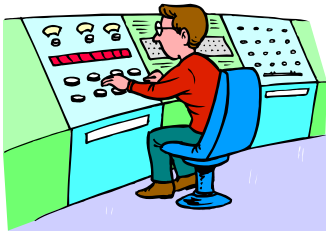
```
*695BAE-MULTI

(695BAE-MULTI

 J1  ACEFA1
 J2  1A59C0

WIRE LIST SIGNATURE:69D075-A58M0
INSUL TEST PARM SIGNATURE:216
                    .
                    .
                    .
HIPOT SOAK TIME 0 SEC

1   J1-001  J2-001
2   J1-004  J2-002

CHECK COMPONENTS
1 DIODE J1-007 J2-008
2 CAP J1-006 J1-003 50 nF 10 %
3 DIODE J1-008 J2-009 LED

)
```

Capacitor and LED diode components added.

Help for CTLWIN

You can get more information about CTLWIN by clicking “help” while in the program. You can access context sensitive help by highlighting a field or menu item and pressing F1.

Overview of Preferences & Settings



What are Preferences and Settings?

The way the tester operates is determined by the following:

- User Preferences
- Learn Settings
- Test Parameter Settings

User Preferences

User preferences affect how the tester operates and interacts with the operator. For example, you may choose whether the operator has to press a button to start a test, or have the test start by itself after the tester senses a connection. User Preferences do *not* affect the critical characteristics of the test.

Learn Settings

Learn Settings affect the way the tester learns a cable. For example, do you want the tester to learn electrical components in the cable? If so, you need to change one of the Learn Settings that checks for components. Another Learn Setting determines how low the resistance of a connection must be before it is recognized as a connection. After a successful learn, the Learn Settings become the Test Parameter Settings for that cable until it is changed.

Test Parameter Settings

Test Parameter Settings affect how a cable is tested. An example of a Test Parameter Setting is the level of high voltage applied to a cable during the high voltage test. The Learn Settings provide the defaults for the Test Parameter Settings. To change the Test Parameter Settings for a particular test, make the test the “loaded test” (by creating a new test or retrieving one from memory), and edit the settings. The Test Parameter Settings determine the parameter signature, which is the last part of the Cable Signature.

Most often, the settings used to learn a cable will be the same settings used to test it; however, there are times when these setting need to be different. The following sections will help you understand how and why to change the settings.

1100H+ Factory Defaults

The tables below list settings in the 1100H+ and their corresponding factory defaults.

User Preferences	Factory Defaults
Test Mode	CONTINUOUS
External Switch	OFF
Fault Location	OFF
Auto Start	OFF
Automatic Hipot	ON
High Speed Hipot	ON
Safety Switch	OFF
Test Count	Good Only
Auto Print	OFF
Digital Outputs	Pin 7 = Good Light On Pin 8 = Bad Light On
Volume	Medium

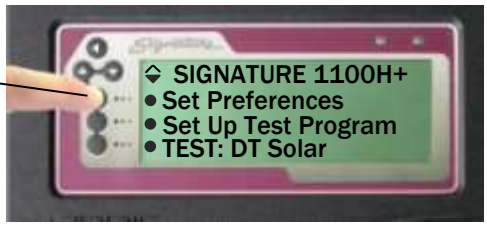
Low Voltage Settings	Factory Defaults
Connection Resistance	10.0Ω
LV Insulation Resistance	100KΩ
Component Resistance	OFF

High Voltage Settings	Factory Defaults
Hipot Test	STANDARD
High Volt ge	50
HV Insulation Resistance	5MΩ
Duration	.01 seconds for VDC and 1 cycle for VAC
Hipot To	ALL PINS
High Capacitance Shield	NO
Max Soak	0 seconds

Restoring Factory Default Preferences and Settings

The factory defaults for User Preferences and Learn Settings may be restored at any time.

1. From the main menu, press **Set Preferences.**
2. Scroll down ▼ and press **Set Factory Defaults.**
3. Press **RESET.**



What Happens When a Cable is Tested?

To understand how to set the preferences and settings, you need to have a basic idea of what happens when a cable is tested.

When the tester is set up with factory default preferences and settings, the test has three parts:

First Part	Second Part	Third Part
Low Voltage Test	**High Voltage (or Hipot) Test**	**Intermittent Test**
The tester checks cables for opens, shorts, and miswires. Components, if present, are also tested.	The tester applies high voltage to the cable as required to test the cable's insulation.	Until the cable is removed, the tester repeatedly runs low voltage tests to check for intermittent errors.

Some preferences and settings affect the low voltage test. Other preferences and settings affect the high voltage (or hipot) test. Still others only affect the intermittent test. Because of its complexity, the high voltage test is explained in more detail below.

Note: The high voltage test will not occur if the test setting **Hipot Voltage** is OFF or if the cable fails the low voltage test. The intermittent test will not occur if the User Preference **Test Mode** is set to SINGLE.

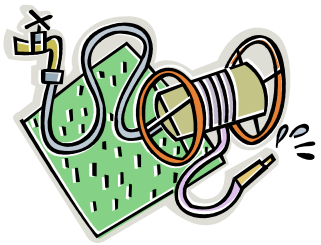
The High Voltage (or Hipot) Test

To correctly adjust the preferences and settings that affect the high voltage test, you need to understand what happens as a high voltage test progresses. Below are descriptions of each part of the high voltage test. To the right of the descriptions we have added an analogy to help convey the basic idea.

First - Voltage Ramp Up

When the tester applies high voltage to a net on the cable, the tester senses the current flow in the net. Initially there is an in-rush of current flow as the tester attempts to bring the net to its high voltage potential. At the same time, other test points are kept at a zero voltage potential. For operator safety, current is limited, and dielectric failures are checked as voltage "ramps up".

The Water Hose Analogy



To illustrate, let's say we capped the end of a water hose and turned on the water. Water flows into the hose until the pressure in the hose builds up. If the hose springs a leak while the pressure builds up, we turn off the water.

Second - Dielectric Withstand Test

The voltage is maintained at the high voltage setting according to a duration setting, which can be varied from 0.01 seconds to two minutes. During this period, the tester performs a **Dielectric Withstand Test,** which checks for high voltage arcs exhibited as sudden current spikes. This test determines whether the cable will grossly fail at a given high voltage potential. An example of an error that would cause this test to fail is two exposed wires that almost touch each other.

Now the hose is full. Let's carefully monitor the water flow into the hose for a moment, and see if the hose springs a leak.

Third - Optional High Voltage "Soak" Period

This optional period is sometimes needed, because cable insulation may leak a little when voltage is first applied. This often happens as some cable insulating materials are susceptible to absorb moisture or other contaminants, which gradually dissipate as high voltage is applied. Therefore, if this option is used after the **Dielectric Withstand Test,** the tester continues to apply the high voltage potential for a period up to the value of a "max soak setting."

Some hoses expand for a moment after you apply pressure. Once the flow into the hose becomes stable, we can go to the next step.

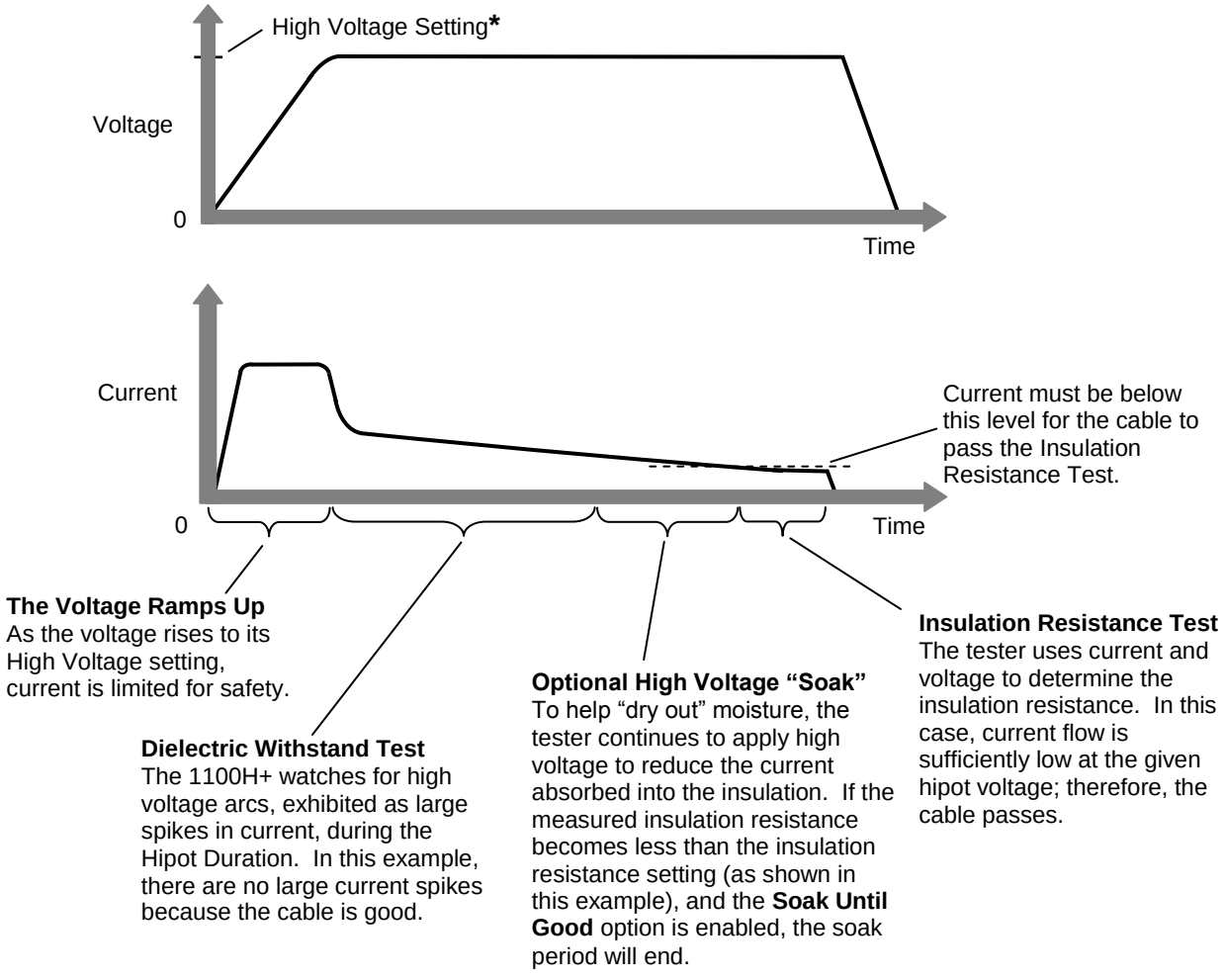
Fourth - Insulation Resistance Test

During this part of the high voltage test, the resistance of the cable insulation is measured to assure it is greater than the insulation resistance setting. Whereas, the **Dielectric Withstand Test** checks for arcs at the high voltage setting, the **Insulation Resistance Test** checks for the gradual flow (or leak) of electricity. An example of an error that would cause this test to fail would be an inferior grade of wire insulation and contamination between connector contacts. Humid conditions often lessen the measured insulation resistance of a cable.

Now let's do an accurate check to see how much water "leaks" from the hose. We can carefully monitor the water flow and determine how well the hose holds the water.

DC High Voltage Test Overview

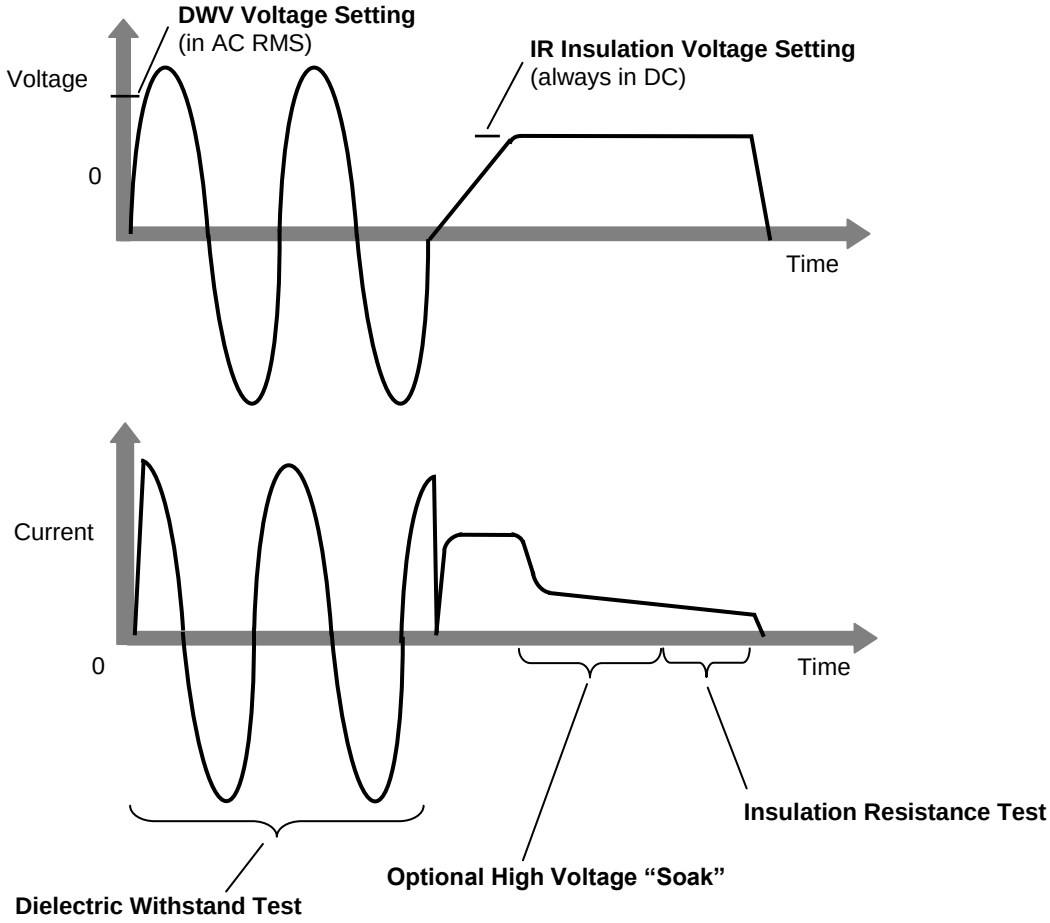
These charts give a more technical overview of what happens during a typical DC high voltage test for a good cable.



Note: This chart shows a single hipot voltage (in the High Voltage setting) throughout the hipot test. However, using the **Hipot Test Advanced** setting allows one voltage to be applied for the **Dielectric Withstand Test** and another voltage for the **Insulation Resistance Test.**

AC Testing

AC testing is an available option on the 1100H+. AC Testing may be required to meet a test specification, in which you cannot substitute an equivalent VDC. For more information, see **Substituting VDC for a VAC** Specification on page 56. When using AC, the hipot test progresses somewhat differently as the graphs below illustrate.



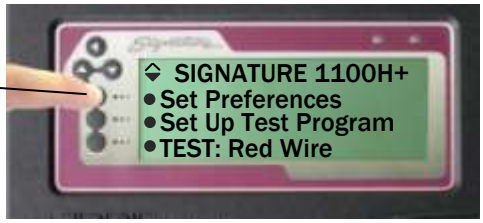
Using VAC for hipot testing causes current peaks due to cable capacitance. These peaks are proportional to how fast the voltage is changing. For more information on the differences between DC and AC hipot testing, see *www.cirris.com/testing/guidelines/ac_hipot_testing.html.*

User Preferences

User Preferences affect the way the tester performs and interacts with the operator, but do not affect the critical characteristics of the test.

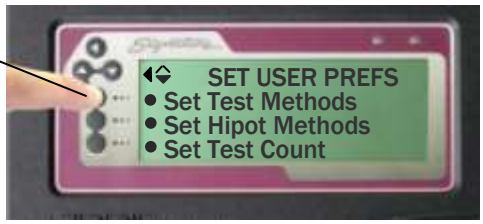
Changing User Preferences

1. From the main menu, press **Set Preferences.**

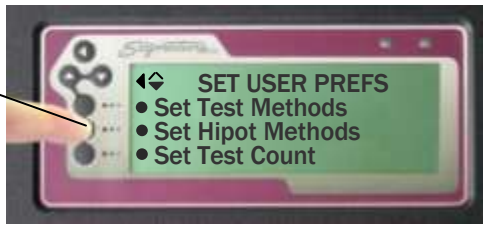


2. Press the desired User Preference option, see below:

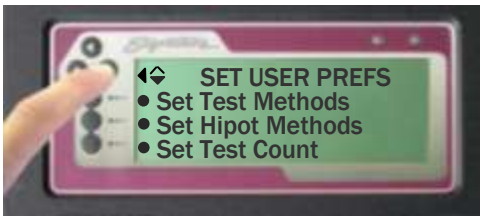
- **Set Test Methods** allows you to access the following user preferences:
  - **Test Mode**
  - **External Switch**
  - **Fault Location**
  - **Auto Start**



- **Set Hipot Methods** allows you to access the following user preferences:
  - **Auto Hipot**
  - **Delay**
  - **Hi-Speed Hipot**
  - **Safety Switch**



3. Scroll down to access the following user preferences:
   - Auto Print
   - Digital Outputs
   - Volume
   - Date
   - Time
   - Factory Default



Each User Preference for the 1100H+ is described on the following pages.

Test Mode

Selections	Factory Default
CONTINUOUS or SINGLE	CONTINUOUS

Test Mode determines how the operator will start a test and whether the tester will continually scan a cable for intermittent errors until removed from the tester.

- **If Test Mode is set to CONTINUOUS,** the test will start automatically when a cable is connected to the tester. After passing the low voltage and hipot test, the tester continuously scans the cable for intermittent errors until the cable is removed.
- **If Test Mode is set to SINGLE,** the test will not start until START TEST is pressed. After completing the low voltage and hipot test, the tester will not scan for intermittent errors.

In CONTINUOUS test mode, you will hear a ticking sound when a cable passes. Each "tick" signifies a successful low voltage scan of the tested cable. If there are errors, the tester continuously "beeps" as it scans the cable to help you find the intermittent errors.

External Switch

Selections	Factory Default
(Selectable only if **Test Mode** is set to SINGLE). ON or OFF	OFF

External Switch allows the tester's digital I/O port to receive an input signal from an external switch to start a test. The external switch, such as a foot pedal or a button, is located away from the tester.

- **If External Switch is ON,** the tester starts a test from the external switch signal.
- **If External Switch is OFF,** the tester does not look for the external switch signal.

Turning "External Switch" on does not inhibit your ability to press START TEST on the tester display. To turn this setting on, the **Test Mode** must be set to SINGLE. For details on using the "External Switch" setting, see **Digital I/O** on page 73.

Fault Location

Selections	Factory Default
ON or OFF	ON

Fault Location determines which end of the cable has the first displayed open, short, or miswire in the tested assembly.

- **When Fault Location is ON**, the tester displays an asterisk next to the pin or pins closest to the open or short.
- **When Fault Location is OFF,** the fault location information will not be displayed.

Because finding fault locations in the tester takes more time, only the fault locations of the first five errors are displayed. If fault locations are required for more than five errors, you can correct the errors and retest the assembly. In most cases, the tester can find the position of the error. The tester locates opens using capacitance and shorts with resistance. For examples of errors where Fault Location is used, see **Shorts** on page 66 and **Opens** on page 67.

Note: For Fault Location to work well, the custom test fixturing should be no greater than one-half the length of the wires in the tested device.

Auto Start

Selections	Factory Default
YES or NO	NO

Auto Start allows the tester to automatically start testing upon boot up.

- **If Auto Start is ON,** the tester will automatically start testing using the loaded test in memory.
- **If Auto Start is OFF,** the tester screen will show the main menu.

This feature can be helpful when the tester is built into automated test equipment where the tester interface cannot be easily accessed.

If you need to access the normal tester interface, once Auto Start has been turned on you may do so by turning on the tester and pressing CANCEL before the Auto Test countdown expires.

Auto Hipot

Selections	Factory Default
ON or OFF	ON

Auto Hipot determines when the high voltage test starts.

- **When Automatic Hipot is ON,** the high voltage test starts automatically after the low voltage test passes and the "Delay" for Automatic Hipot has expired (see "Delay" below).
- **When Automatic Hipot is OFF,** the hipot test starts only when an operator presses START HIPOT.

Auto Hipot allows operators to avoid having to press START HIPOT to initiate the hipot test. However, some cable assemblies may have exposed connections, conductive connector housings, or cable shielding which will become electrified during the hipot test. Forcing a button push before the hipot test, helps ensure that operators do not have their hands on the cable.

Delay
This setting is enabled when Auto Hipot is turned on. You can change the delay to extend the time between the completion of the low voltage test and the beginning of the hipot test. The delay may be set from .1 to 2 seconds.

Hi-Speed Hipot

Selections	Factory Default
ON or OFF	ON

Hi-Speed Hipot determines whether the tester will use advanced algorithms to speed the hipot test.

- **When High Speed Hipot is ON,** the tester uses advanced algorithms. The algorithms allow the tester to perform the hipot test much faster by applying high voltage to several nets simultaneously in a pattern that ensures each net is hipot tested against every other net.
- **When High Speed Hipot is OFF,** the tester applies high voltage to each net one at a time.

Note: If the tester finds an error during the "High Speed Hipot" process, it switches to the low-speed routine to find which wire failed. This means a failed hipot test will actually take longer than a passed hipot test. The tester may not be able to duplicate a dielectric error found in the high-speed routine and displays the error "Dielectric Failure Undetermined Net". This would be the case if an arc occurred while in the high-speed routine which cleared away a conductive path. Some specifications may require you to test with "High Speed Hipot" turned OFF.

Safety Switch

Selections	Factory Default
ON or OFF	OFF

Safety Switch requires that the tester sees a high signal on pin 2 of the digital I/O connector before starting the hipot test. Safety Switch can be used to help ensure an operator does not shock themselves during a hipot test.

- **When Safety Switch is ON,** the tester will look for a high signal on pin 2 of the digital I/O connector before starting a hipot test.
- **When Safety Switch is OFF,** the tester ignores the signal status of input pin 2 on the digital I/O connector.

Safety Switches can be dual palm switches wired in series, a foot pedal, or a sensor in automated test equipment. For more information on wiring a safety switch, see **Hipot Safety Switch** on page 74.

Test Count

Selections	Factory Default
GOOD CABLES ONLY or ALL CABLES	ALL CABLES

Test Count determines the types of tested cable counts listed in the test summary.

- **When Test Count is set to ALL CABLES,** the test summary includes four counts: total cables tested, cables tested good, cables tested bad, and cables tested intermittent.
- **When Test Count is set to GOOD ONLY,** the test summary includes the count for good cables only.

The factory default ALL CABLES is more informative. However, some customers prefer to use GOOD CABLES ONLY.

Auto Print

Selections	Factory Default
ON or OFF	OFF

Auto Print determines whether the tester will automatically print test results after each test.

- **When Auto Print is ON,** you can select one of six reports that will automatically print test results. Depending on the type of selected report, the report will print after one of the following: (1) a good or bad cable is tested, (2) a good cable is tested, or (3) a bad cable is tested.
- **When Auto Print is OFF,** the tester will print test results *only* when an operator presses PRINT TEST SUMMARY.

Auto Print allows you to select one of three standard reports or one of three custom reports. The standard reports are: **All, Standard; Good, Standard;** or **Bad, Standard.** The **All, Standard** prints a short one line report after each test whether the cable tests good or bad. The **Good, Standard** prints a full page report after a cable tests good. The **Bad, Standard** prints a full page report after a cable tests bad.

The reports **autoall.rpt, autogood.rpt, and autobad.rpt** can be customized if you purchased the scripting option. Being able to customize reports allows you to put your company name on the report and choose the data displayed on the report.

Regardless of the type of report selected, you can print a test summary after any test when testing a run of cables. Remember, when you select a report, the same report will be used for all test programs until you change the report selection.

Digital Outputs

Selections	Factory Default
disable/enable pins 5, 6, 7, 8, 10, 11	pin 7 = Cable Counted Good pin 8 = Cable Counted Bad

Digital Outputs determines how the tester controls the output pins on the the digital I/O port. The 1100H+ has six digital outputs which can drive an external device according to various “events” in the tester. These events occur as the tester powers up, learns a cable, tests a cable, and displays test results. Controlling an output line requires two triggering events. For more information, see **Digital I/O** on page 73.

Volume

Selections	Factory Default
Off, Low, Medium, High	Medium

Volume allows you to mute or adjust the volume of the tester. If you need louder sound, you can make an adjustment inside the unit. For more information, see Changing Volume and Display Controls on page 86.

Factory Defaults

Factory Defaults restores the factory defaults for the tester’s User Preferences and Learn Settings.

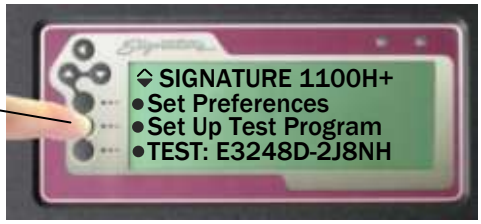
Low Voltage Resistance Settings

Changing Learn and Test Parameter Settings

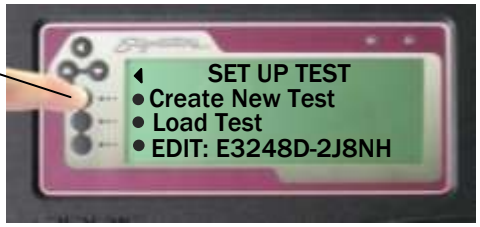
Learn Settings affect the way the tester learns a cable. After a cable is learned, the Learn Settings become the Test Parameter Settings for that cable, which determine how a cable is tested.

Changing Learn Settings

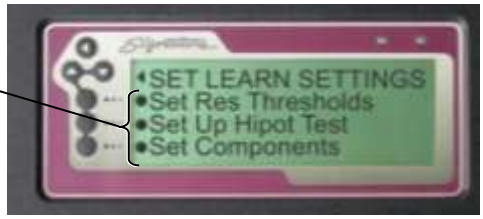
1. From the main menu, press **Set Up Test Program.**



2. Press **Create New Test.**
3. Press **Set Learn Settings.**



4. Select the appropriate category of Learn Settings.
5. Select the specific Learn Setting you want to change. You may need to scroll down ▼ to see all settings in the category.
6. Set the desired value for the Learn Setting. Some Learn Settings toggle between two values, and others scroll through a range of values.
7. Press **ACCEPT** or back ◀ to exit the specific test setting.
8. Press back ◀ to exit the category of Learn Settings.
9. Press back ◀ to exit the SET LEARN SETTINGS menu.



Changing Test Parameter Settings

You can only edit the Test Parameter Settings of the loaded test program.

1. Make sure the test program you want to edit is loaded,

   OR

   Load a new test program by learning a cable or retrieving the test from memory.

2. From the main menu, press **Set Up Test Program.**

3. Press **Edit** to edit the loaded test.

4. Select the category of test settings you want to edit.

5. Select the specific test setting you want to edit.

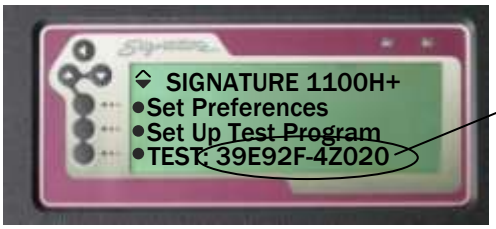
6. Set the desired value for the Test Parameter Setting. When selected, some Test Parameter Settings toggle between two values, while others scroll to the desired value.

7. Press **ACCEPT** or back ◀ to exit the specific Test Setting.

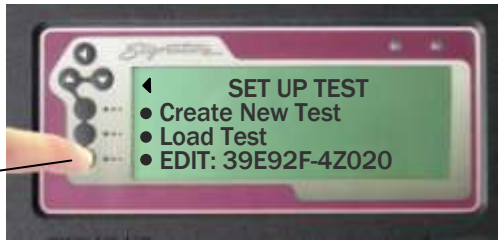
8. Press back ◀ to exit the category of test settings

9. Press back ◀ to exit the Edit menu.

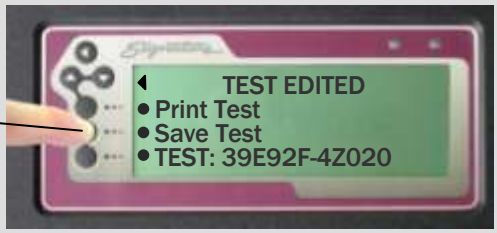
   If you made changes, a screen briefly confirms the changes in the loaded test program.



The cable signature or file name of the loaded test is displayed on the main menu.



Note: If you edit a loaded test, the test is not updated until you save it back to the same memory location.

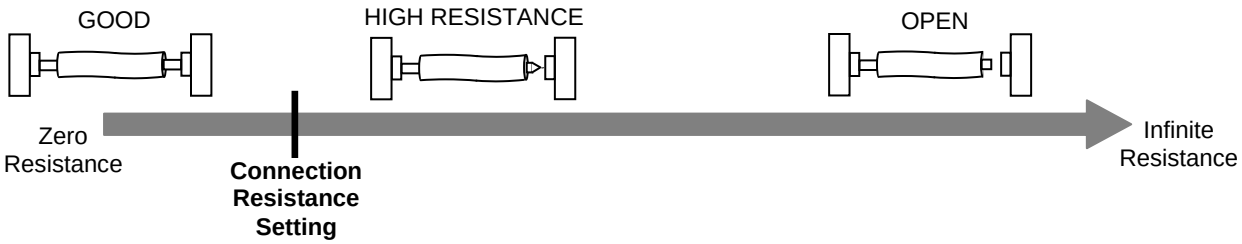


Each Learn and Test Parameter Setting used for setting low voltage resistance thresholds is described on the following pages.

Connection Resistance (Conn Res)

Selections	Factory Default
.1Ω-100KΩ, 500KΩ 1MΩ, 5MΩ	10.0Ω

How good are the connections in a cable? The "Connection Resistance" setting specifies the *maximum* resistance a connection can have, and still be considered good as opposed to having high resistance.



When you learn a cable, the cable's connections must be lower in resistance than the **Connection Resistance** setting to be learned as connections. When you test a cable, the cable's connections must be lower than the **Connection Resistance** setting to pass the test.

Connection Resistance Guidelines

- To allow for cable and tester tolerances, you should generally select a connection resistance at least 20% or 0.2 ohms (whichever is greater) above the resistance of the actual connections.
- Over time, heavily used adapters can develop worn contacts, which will add to the connection resistance measurement. Cirris recommends replacing worn adapters before they affect the measured connection resistance and create high resistance errors. If you must use adapters with substantial wear, you will have to increase the **Connection Resistance** setting to get cables to pass.

The tester can measure the actual connection resistance and give you a suggested value for the Connection Resistance setting.

Calculating a Suggested Connection Resistance Setting

1. Attach a sample cable.
2. From the main menu, press **Create New Test, Set Learn Settings, Set Lrn Res Thrsholds,** and **Calculate Conn Res.**
3. The tester measures the resistance of each wire and displays a suggested res value, which is 20% greater than the highest measured resistance in the sample cable.

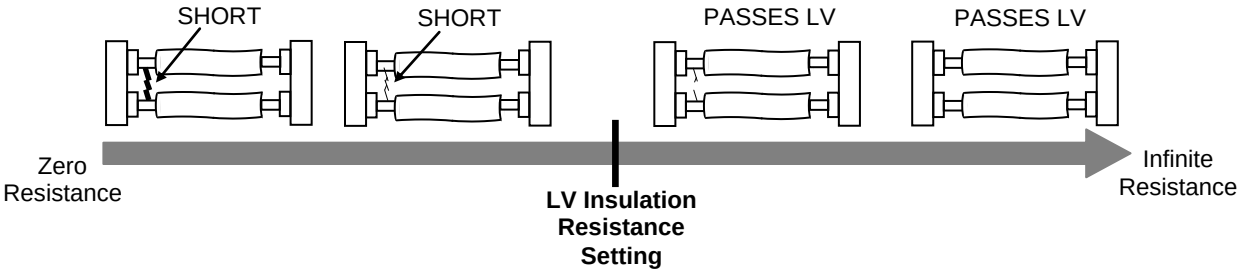
To help determine a better **Connection Resistance** setting, measure the variances of several sample cables, connect each cable, and press **Calc New Sample.**

Note: Use **Calculate Conn Res** with caution. A bad sample cable may cause the suggested value to be higher than it should be.

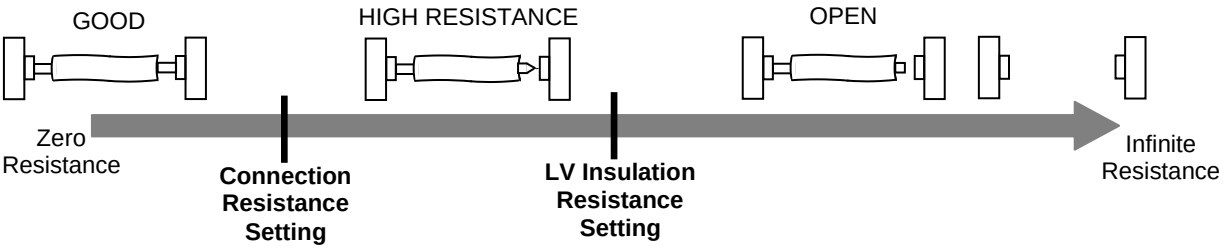
LV Insulation Resistance (LV Insul Res)

Selections	Factory Default
0.1Ω-100KΩ, 500KΩ, 1MΩ, 5MΩ	100KΩ

"LV Insulation Resistance" only affects the low voltage test where the basic cable pattern and gross insulation problems are identified. This setting determines how high the insulation resistance must be between cable nets to pass the low voltage test. The tester displays SHORT for an unintended resistance between nets that is less than the LV Insulation Resistance setting.



In addition, the LV Insulation Resistance setting determines at what resistance intended connections are considered *open,* as opposed to having high resistance.



LV Insulation Resistance Guidelines

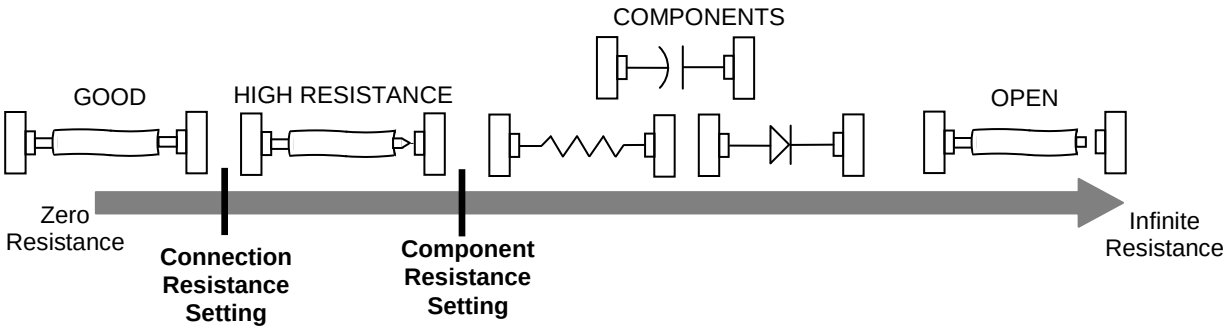
The factory default of 100KΩ should work well for most cable testing applications. The higher you raise the LV Insulation Resistance setting, the longer it takes for the tester to perform the low voltage test.

Note: Resistances above the LV Insulation Resistance setting will be ignored during a learn.

Component Resistance

Selections	Factory Default
(automatically set) .1Ω-5MΩ	OFF

"Component Resistance" is automatically determined when the Learn Components setting is turned ON and components are sensed in the cable. The tester sets component resistance to 20% less than the lowest resistor value found in the cable. The figure below shows the Component Resistance setting in relation to the other settings that affect the low voltage test.



Changing Component Resistance

In some rare instances, you may need to change the component resistance by editing a loaded test program. Change the component resistance if you have the following:

- Components with resistance so low that you lose the "measurement window" between Connection Resistance and Component Resistance settings. In this case, you potentially have two options:

  Option 1: You can raise the Connection Resistance and Component Resistance settings to test components as connections.

  Option 2: If cable connections have more than .1Ω of resistance, lower both the Connection Resistance and Component Resistance settings below the cable connection resistance. Wires and components will be measured as components.

- Large capacitors (values greater than 10 microfarad). In this case, you may need to change the Component Resistance setting below 1KΩ so the capacitors will not be reported as shorts.

High Voltage Settings

Hipot Test

Selections	Factory Default
OFF, STANDARD, ADVANCED	STANDARD

"Hipot Test" determines whether the tester performs the hipot test and if so, what settings will be used.

- **When Hipot Test is OFF,** the tester does not perform a hipot test when the assembly is tested.
- **When STANDARD is selected,** the hipot settings are simplified. The same settings are used for the Dielectric Withstand (DW) Test and the Insulation Resistance (IR) Test.
- **When ADVANCED is selected,** more hipot settings are available. The added settings allow increased and independent control over the Dielectric Withstand (DW) Test and Insulation Resistance (IR) Test.

The chart below contrasts the settings for the Standard and Advanced Hipot Test.

Hipot Test Settings: Standard vs. Advanced		
Setting	**Standard Setting**	**Advanced Setting**
Hipot Mode	VDC	Allows operator to select either AC or DC for DWV test
Frequency	N/A	Allows operator to select the frequency if a VAC is selected for DWV test
DWV Current	N/A	Allows operator to select value from 100uA to 1.5mA
DWV Voltage and **HV Insul Voltage (HV Voltage)**	Sets the same high voltage for both DWV and IR tests	Allows operator to select separate high voltages for DWV and IR tests
Insulation Resistance Time	Allows operator to select from .01, .1, 1, 2, 5, 10, 30, 60, and 120 s	Allows operator to select period between 2 ms and 60 s
Soak Until Good and **Soak For**	Only **Max Soak** period may be used	Allows either a defined **Soak For** period or **Max Soak** period

High Voltage

Selections	Factory Default
1000V Unit: 50V, 100V, 200V, 300V, 400V, 500V, 630V, 800V, 900V, 1000V **1500V Unit:** 50V, 100V, 200V, 300V, 400V, 500V, 630V, 800V, 900V, 1000V, 1100V, 1200V, 1300V. 1400V, 1500V	50 V

"High Voltage" determines the voltage applied to a cable during the hipot test. A higher High Voltage setting tests higher levels of insulation resistance between nets; however, there are limits to the amount of high voltage you should use on a cable assembly.

High Voltage Guidelines

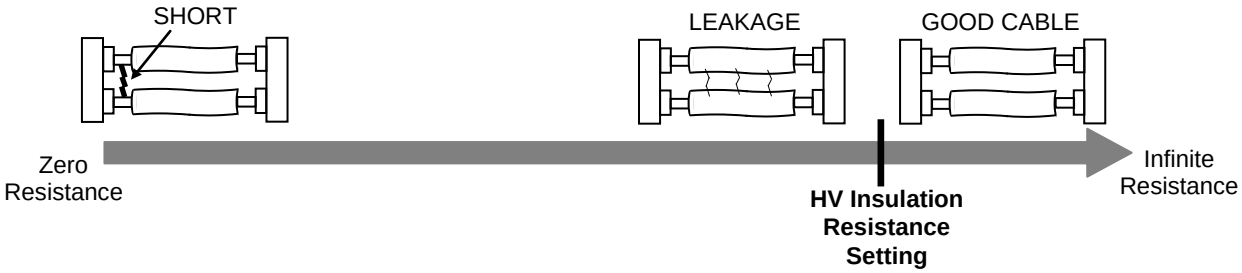
The High Voltage setting may be dictated by a customer or engineering specification. If you do not have a specification, below are some general guidelines:

- The spacing between the pins in a connector, as well as the separation of the conductors in a cable, limits the amount of voltage that can be applied to a cable.
- Use the manufacturer's specifications for the wire and connectors used in a cable.
- The High Voltage setting affects the available selections for the Insulation Resistance Settings. For more information, see the Available HV Insulation Resistance Settings table on the next page.
- Highly capacitive cables may limit the amount of high voltage that can be applied to the cable. See the "1100H+ Spec Sheet" on the Cirris website for these capacitance limits.

HV Insulation Resistance
(HV Insul Res)

Selections	Factory Default
(Available selections limited by High Voltage Setting) 5MΩ,10MΩ, 20MΩ, 50MΩ, 100MΩ, 200MΩ, 500MΩ, 1GΩ	10MΩ

How well are the nets in a cable isolated? "HV Insulation Resistance" determines the minimum resistance allowed between nets. Nets with insulation resistance less than the Insulation Resistance setting are considered to have leakage and fail the hipot test. Nets with insulation resistance higher than the Insulation Resistance setting pass the hipot test.



The "HV Insulation Resistance" settings are limited by the high voltage settings. The table below shows the available Insulation Resistance settings at each of the high voltage settings.

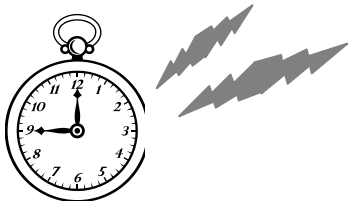
High Voltage	Available HV Insulation Resistance Settings (1000 Volt Unit)							
	5.00MΩ	10.0 MΩ	20.0 MΩ	50.0 MΩ	100.0 MΩ	200.0 MΩ	500.0 MΩ	1.00 GΩ
50 V	✓	✓	✓	✓				
100 V	✓	✓	✓	✓	✓			
200 V	✓	✓	✓	✓	✓	✓		
300 V	✓	✓	✓	✓	✓	✓		
400 V	✓	✓	✓	✓	✓	✓		
500 V	✓	✓	✓	✓	✓	✓	✓	
630 V	✓	✓	✓	✓	✓	✓	✓	
800 V	✓	✓	✓	✓	✓	✓	✓	
1000 V		✓	✓	✓	✓	✓	✓	✓
Available HV Insulation Resistance Settings (1500 Volt Unit)								
1100V			✓	✓	✓	✓	✓	✓
1200V			✓	✓	✓	✓	✓	✓
1300V			✓	✓	✓	✓	✓	✓
1400V			✓	✓	✓	✓	✓	✓
1500V			✓	✓	✓	✓	✓	✓

HV Insulation Resistance Guidelines

Specifications may dictate the Insulation Resistance setting, which may be based on some of the following factors:

- **Allowed Contamination**
  Cables in high voltage and sensitive electronic equipment must have a stringent test because of their ultimate use. Other cables may be tested at lower levels to allow for contamination, such as fingerprints and mold release.
- **Cable Length**
  Long cables may need a lower **Insulation Resistance** setting to accommodate the cumulative effect of small current leakages along their length.
- **Humidity**
  A humid environment can aggravate the effects of contamination between cable contacts and affect cable insulation. For more information, see **Max** Soak on page 54.

Duration



Selections	Factory Default
VDC .01, .1, 1, 2, 5, 10, 30, 60, 120 seconds	.01 seconds
VAC 1, 10, 60, 300, 3600, or 7200 cycles	1 cycle

"Duration" determines the amount of time the high voltage is applied to each net during the Dielectric Withstand Test, which occurs during the hipot test. If using an AC test voltage for the Dielectric Withstand Test, the duration (typically referred to as "dwell") is set in cycles rather than seconds. If you do not have a Duration Specification, use the following guidelines:

Changing Duration Guidelines

- The default setting for this parameter of 0.010 seconds (10 milliseconds) should be adequate to test most cables. A longer Duration will increase the total hipot test time.
- A shorter Duration without any Soak Time is more likely to fail due to humidity related problems since absorbed moisture may not have time to be "dried out" of the cable before the Insulation Resistance Test.
- A longer Duration provides a more stringent test for predicting dielectric failures (exhibited as sudden arcs); however, equivalent dielectric errors can be found by compensating a shorter Duration with a higher High Voltage setting.
- A longer Duration may be better for predicting some types of insulation failures and may increase the chance for detecting a breakdown condition.

Hipot To

Selections	Factory Default
ALL PINS, or CONN ONLY (Limited to ALL PINS if **High Capacitance Shield** is YES)	ALL PINS

"Hipot To" determines which test points the tester applies high voltage to.

- **When Hipot To is set to ALL PINS,** the tester applies high voltage to all adapter test points, regardless of whether they have connections to other points in the test.
- **When Hipot To is set to CONN ONLY,** the tester applies high voltage only to adapter test points that have connections to other test points in the test.

If unused connector pins have loaded contacts (metal in the holes); you should use the ALL PINS selection. This ensures the tester will catch high voltage shorts between unconnected contacts. If not, using CONN ONLY can save test time.

Setting "High Capacitance Shield" to YES forces the "Hipot To" setting to ALL PINS and cannot be changed. This ensures the tester catches a condition where leakage occurs from a high capacitance shield to an unused pin.

High Capacitance Shield
(High Cap Shield)

Selections	Factory Default
YES, NO	NO

"High Capacitance Shield" allows a cable to pass with *one* net too capacitive to pass a hipot test. This setting is often used when a shielded cable is hipot tested. Cable shields usually have substantially higher capacitance, because the shield surrounds, and has capacitance to, all wires in a cable. To avoid an unsafe shock hazard during a hipot test, the tester will not continue to charge a highly capacitive net.

- **If High Capacitance Shield is set to NO,** the tester reports an Overcurrent Error when it stops charging a highly capacitive net.
- **If High Capacitance Shield is set to YES,** the tester ignores a single Overcurrent Error generated by a cable shield (as long as all other wires pass).

High Capacitance Shield Guidelines

- A single-net hipot failure can be an indication of a net with high capacitance. Normally, hipot failures show up with at least two failed nets.
- By turning on the High Capacitance Shield setting, you can successfully test a cable with a highly capacitive shield.

Max Soak

Selections	Factory Default
0, .01, .1, 1, 10, 30, 60, 120 seconds	0 seconds

SOAK Overview

In some cables, the current flow stabilizes quickly when high voltage is applied. In other cables the current flow may take longer to stabilize due to humidity, dielectric absorption, temperature, residual charges, or other factors. To compensate for cables that take longer to become steady, Cirris testers have the “SOAK” capability. SOAK applies voltage to the cable for a period of time to "dry out" or stabilize the current flow so the tester can perform an accurate Insulation Resistance test. SOAK allows you to meet the required procedure of Mil-Std-202F method 302 paragraph 1.3 which states: “...When electrification time is a factor, the insulation resistance measurements shall be made immediately after a 2-minute period of uninterrupted test voltage application, unless otherwise specified. However, if the instrument reading indicates that an insulation resistance meets the specified limit, and is steady or increasing, the test may be terminated before the end of the specified period.” If you want to apply a forced voltage for a specific period of time before the I.R. test is done, change the Advanced Hipot settings and uncheck the box marked “Soak Until Good.” You can then set a “Soak For” time that applies voltage for the entire time specified before performing the I.R. test (see the next page for more information).

“Max Soak” allows the tester to monitor the insulation resistance for a selected period of time. If the I.R. becomes "good" (i.e. actual I.R. reading becomes greater than the Insulation Resistance setting), the I.R. test is deemed "good" for that net; the test immediately stops for that net and moves onto the next net.

Note: When a Max Soak time is set, the tester continues to monitor the Dielectric Withstand Current. If the Dielectric Withstand Current is exceeded, the tester emits a "Dielectric Failure".

Max Soak Guidelines

- Max Soak diagnoses certain failures. If your cables are failing with a voltage leakage error, you might increase Max Soak. If the problems disappear, the cable likely has a dielectric or moisture absorption problem.
- If a cable must exhibit rigorous high voltage resistance in humid environments, turn Max Soak off.
- Use a longer **Max Soak** setting for measuring best-case insulation resistances, or for testing the physical properties of insulation independent of environmental degradation.
- Use a shorter **Max Soak** setting for detecting corona (small current spikes that occur as moisture dissipates from the cable) and other humidity-related problems in a cable.

Soak Until Good

Selections
OFF, ON

For a description of the SOAK capability, see **Max** Soak on page 54.

In the Advanced Hipot settings, you can turn Soak Until Good ON or OFF.

- **When Soak Until Good is ON,** the tester displays Max Soak settings and applies voltage to each net in the cable until it either, a: passes the I.R. test, or b: completes the Max Soak time (the same behavior occurs when using the Standard Hipot setting).
- **When Soak Until Good is OFF,** the tester displays the Soak For setting, see the next section for details.

Note: Unless specifications require otherwise, turning this setting ON can save test time.

Soak for

Available only when “Hipot Test: Advanced” is selected.

Selections
002, .017, .02, 1, 10, 30, 60, 120 Seconds

“Soak For” applies voltage to each net in the cable for the specified time BEFORE performing the I.R. test.

Note: Soak For will generally result in a slower hipot test as each net will be "soaked" for the entire Soak For period.

Hipot Mode

Available only when “Hipot Test: Advanced” is selected.

Selections
(May be changed to AC only when the tester is equipped with the AC option)
AC, DC

“Hipot Mode” allows you to select whether the tester will apply AC or DC in the Dielectric Withstand Test. If you select AC, the “Frequency” setting is displayed, and the “Duration” setting is set in cycles rather than time.

Hipot Mode Guidelines

Whenever possible, use DC for safety and test reliability. In many cases, you may be allowed to substitute an equivalent VDC for a VAC specification as explained on the next page.

Substituting VDC for a VAC Specification

Testing with VDC is generally considered safer for the tested assembly. MIL STD 202F (April 1980) on testing electronic components states:

> *When either alternating current or direct current test voltages are used, care should be taken to be certain that the test voltage is free of recurring transients or high peaks. Direct potentials are considered less damaging than alternating potentials, which are equivalent in detecting flaws in design or construction. However, the latter are usually specified because high alternating potentials are more readily obtainable.*

Additionally, using VDC hipot may provide more reliable hipot test results. The General Military Specification for wiring harness, space vehicle, design, and testing (DOD-W-83575A USAF, December 1977) states, regarding the high potential withstand test:

> *This test shall be performed using either a 60 Hz ac test potential or a dc potential. Because the wiring capacitance results in higher ac currents that may give erroneous indication of breakdown, only the dc test is recommended for cables longer than 3 meters.*

If a VDC is to be used in place of a VAC, the equivalent VDC should be at least 1.4 times the VAC (RMS) specification. As stated in DOD-W-83575A USAF, December 1977:

> *When a DC potential is used, the test shall be performed in the same manner as described for the ac test except that the dc potential used shall not be less than 1.4 times the appropriate ac test potential.*

To arrive at a DC duration setting relating to the AC dwell specification, divide the AC dwell specification (number of cycles) by the AC frequency specification in hertz (cycles per second). This will give you an equivalent DC duration setting in seconds.

Frequency

Available only when “Hipot Mode: AC” is selected.

Selections
25, 30, 50, 60 Hz.

“Frequency” defines the frequency of AC waveform cycle when AC is selected for the “Hipot Mode” setting. This setting is often dictated by a customer or engineering specification.

DWV Voltage

Available only when “Hipot Test: Advanced” is selected.

DC Selections
1000V Unit: 50V, 100V, 200V, 300V, 400V, 500V, 630V, 800V, 900V, 1000V **1500V Unit:** 50V, 100V, 200V, 300V, 400V, 500V, 630V, 800V, 900V, 1000V, 1100V, 1200V, 1300V, 1400V, 1500V

“DWV Voltage” determines the voltage that is applied to each net in the Dielectric Withstand Test where gross hipot failures, such as arcs and breakdown conditions, are detected. This setting is often dictated by a customer or engineering specification. If you do not have a specification, the
High Voltage guidelines for the settings (page 50) are applicable to this setting.

DWV Max Current

Available only when **Hipot Test: Advanced** is selected.

Selections
100uA (.1mA), 200uA (0.2mA), 500uA (0.5mA), 1mA, and 1.5mA

“DWV Max Current” determines the maximum current that is allowed to flow out of each net during the Dielectric Withstand Test. If current flow exceeds this setting, the tester will fail the tested assembly and display a dielectric error, indicating an arc or insulation breakdown.

DWV Max Current Guidelines

The DWV Current setting is often dictated by a customer or engineering specification. If you don’t have a specification, here are some general guidelines:

- Use a lower setting to provide a more stringent test, but too low of a setting may cause false failures.
- Cables with higher internal capacitance may necessitate using a higher setting, especially if you are testing with a VAC where current surges occur throughout the test period proportionally to the capacitance in the tested device.

HV Insulation Voltage
(HV Insul Voltage)
Available only when “Hipot Test: Advanced” is selected.

Selections
(Available selections limited by High Voltage Setting) **1000V Unit:** 50V, 100V, 200V, 300V, 400V, 500V, 630V, 800V, 900V, 1000V **1500V Unit:** 50V, 100V, 200V, 300V, 400V, 500V, 630V, 800V, 900V, 1000V, 1100V, 1200V, 1300V, 1400V, 1500V

“HV Insulation Voltage” determines the voltage that is applied to each net during the Insulation Resistance Test.

Note: The tester does not permit you to set this voltage higher than the equivalent DWV Voltage. This setting specifies a VDC. If you do not have a specification for this setting, the High Voltage guidelines (page 50) are applicable.

Insulation Resistance Time
(Insul Res Time)
Available only when “Hipot Test: Advanced” is selected.

Selections
.002, .017, .02, 1, 10, 30, 60 Seconds

“Insulation Resistance Time” specifies the time period that the insulation resistance measurement must remain below the insulation resistance setting during the Insulation Resistance Test. Unless otherwise specified, the default setting of .002 second (2ms) is typically sufficient.

Component Settings & Test

Learn Components

Selections	Factory Defaults
On or Off for: Resistors, Diodes, Capacitors Twisted Pair, 4W Kelvin	Off for all Component types

"Learn Components" is found in Learn Settings. Learn Components determines whether the tester looks for the existence of components when learning a cable. From the main menu, you can access the Learn Components menu by selecting **Set Up Test Program, Create New Test, Set Learn Settings,** and **Set Components.** If you learn a cable with components, the Parameter Signature (the last five digits of the Cable Signature) is displayed as MULTI.

Learning an Assembly with Components
After learning a cable assembly, the technician should verify the test program (page 18). When verifying the test program of a cable assembly with components, you must assure that each component in the learned cable assembly is identified with the appropriate component or link command. The following topics in this section can help you understand how to do this.

Components Learned and Tested

The 1100H+ can learn and test resistors, capacitors, diodes, twisted-pairs, and 4-wire Kelvin. Though twisted-pairs and 4-wire Kelvin are not technically components; the tester interface uses the term "component" to describe certain electrical characteristics between points. Some components may not be learned, but can be effectively tested if the test program is edited. The chart below compares learn and test capability for the tester.

Learn	Test
Resistors: 0.1Ω to 100KΩ; (>100KΩ to 5MΩ learn as links).	**Resistors:** 0.1Ω to 1MΩ
Capacitors: 400 nF to 100 µF	**Capacitors:** 5nF to 100µF ± 10% ± 20pF (relative measurements to 10pF)
Common silicon diodes **Zener diodes:** Learn as a standard diode as long as zener voltage > 4V	Common silicon diodes **Zener diodes:** Test as standard diode as long as zener voltage > 4V LEDs
Note: The tester does not learn or test germanium diodes, Shottky diodes, and diodes in series with some resistors. The tester recognizes these components as opens and shorts.	
Twisted-pairs: Minimum length 1 to 6 feet depending on electrical characteristics of twisted-pair. Minimum of 3 wires in cable.	Same as Learn
4-Wire Kelvin: 0.001Ω to 10.0Ω ±2% ±0.001Ω	Same as Learn

Links

In some cases, the tester may sense the electrical characteristics of a component, but cannot determine if the component is a resistor, diode, or capacitor. When this occurs, the tester creates a "link" in the test program to ensure that no high voltage is applied across the component during the hipot test. Essentially, the tester applies high voltage simultaneously to linked test points; thereby, ensuring voltage is not dropped across the link and that the link is effectively isolated from other cable connections. During the Low Voltage test, the tester assures the linked points have a higher resistance than the **Component Resistance** setting. Links may be created either automatically by the tester or by the technician setting up the test.

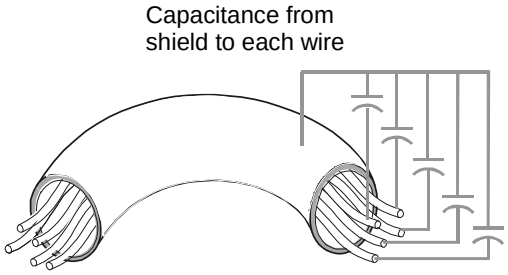
Links created automatically by the tester

When verifying a learned test program, a technician may recognize the tester created links in the test program's net list. In some cases, the tester may have assigned a component a link, because it was outside the tester learn range. However, in some instances, the component can still be effectively tested if the technician uses CTLWIN to edit the links assigned by the tester. For example, in order to speed the learn process for the majority of cables, the tester does not learn component resistances higher than 100KΩ. However, the tester *does* assign links to resistors with values above 100KΩ and below the Low Voltage Insulation Resistance setting, which can be set up to 5MΩ. If the tester creates a link for a resistance in the 100KΩ to 1MΩ range, the technician can use CTLWIN to replace the link with a resistor command; thereby, allowing the tester to test the resistance value.

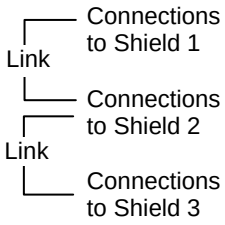
Links created by the technician

In some instances, the technician setting up the test program may need to use CTLWIN to create links in the test program. By linking two or more test points, the tester will treat the linked points as one net during the hipot test.

For example, a cable might have three shields. During high voltage testing, each shield could have substantial capacitance between itself and all the wires it encompasses. To avoid an unsafe shock hazard during a hipot test, the tester will *not* continue to charge a highly capacitive net. Turning ON the setting HIGH CAP SHEILD will ignore the hipot failure on one of the shields; however, the other two shields would continue to fail the high voltage test.



To avoid this problem, use CTLWIN to create two links so the tester treats the shields as one net. During the high voltage test, high voltage will be applied simultaneously to all three shields ensuring their isolation from other cable connections. During the low voltage test, the tester checks that the resistance between the linked shields is higher than the Component Resistance setting.



4-Wire Kelvin

The 1100H+ tester can perform **4-Wire Kelvin** resistance measurements. This capability allows you to null out fixturing resistance and measure very low resistances (down to .001 Ω).

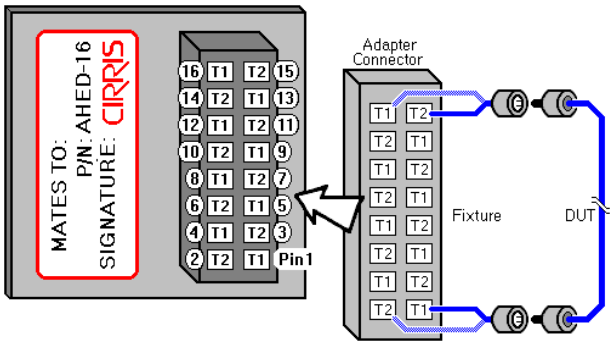
The standard 2-wire resistance measurement requires a single test point for every connection on the device-under-test. The 4-wire measurement requires two correctly paired test points for every connection. One test point supplies current (typically referred to as “force”), while the other senses voltage (typically referred to as “sense”).

You may connect force to sense on the contact mechanism to the device-under-test and see a very small interface resistance. However, if you bring force and sense together directly on the contact of the device-under-test, you will eliminate all sources of interface resistance. This extra effort may not be feasible. For more information, see “Four Wire Kelvin Testing” at *http://www.cirris.com/testing/resistance/fourwire.html.*

Note: 2-wire and 4-wire testing can be put into any combination on the 1100H+ tester.

Building 4-Wire Fixturing

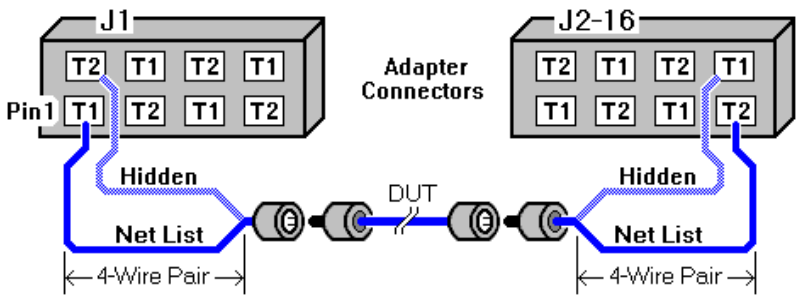
For the purpose of 4-wire testing, the 1100H+ test points are considered either Type 1 (T1) or Type 2 (T2) points. Each 4-wire pair from the tester must have one of each point. The tester uses T1 points as either force or sense; it uses T2 points as the compliment. While you can use any standard adapter to run 4-wire fixturing from the tester, Cirris suggests using one of the Cirris AHED series adapters. The AHED adapters map T1 and T2 points in a uniform alternating pattern as shown on the next page. The probe can also be used to identify T1 and T2 points as described further in this section.



The 1100H+ tester must learn a 4-wire fixture. When the fixture is learned, the first-scanned point of each 4-wire pair becomes the visible point in the Net List. Both test points are listed below the Net List in the 4W-Wire Kelvin Pairs.

4-wire fixturing can be constructed in an alternating or separate method. The Alternating method (shown below) is easy to use. With ribbon cable, you solder adjacent wires to join 4-Wire Pairs. While easy, the connector adapter pin numbers won't match the pin numbers of the device-under-test since only the visible point shows in the net list; however, custom test point labels can be used to remedy the pin out numbering.

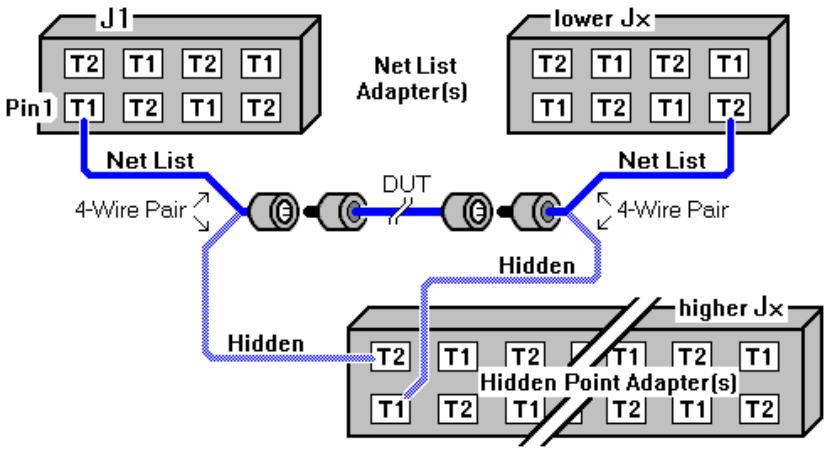
Alternating Method



The other way to construct 4-wire fixturing is to use the separate method (shown below). Although more difficult to construct, the separate method will create a Net List, which will document correctly without using custom test point Labels. A 2-wire Net List can be preserved when converting to 4-wire.

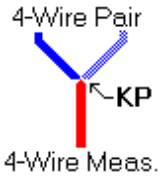
Note: Because the first scanned point of a 4-wire pair becomes the visible point; make sure hidden point adapter(s) are in a higher-counting "J" position than Net List adapter(s).

Separate Method

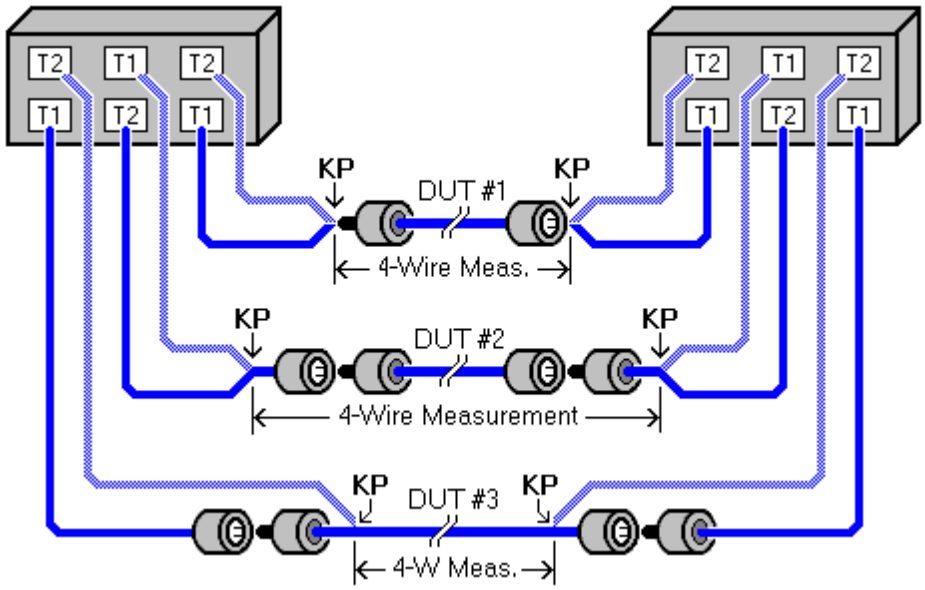


The Location of Kelvin Points in Fixturing

The location where the 4-wire pair physically joins the test point connection of the device-under-test is called a Kelvin point.



Each 4-wire measurement requires two Kelvin points; one at each end of the tested device. The Kelvin points should be placed as close to the device-under-test as possible. This is because the 4-wire test measures from Kelvin point to Kelvin point, so any contact and lead resistance between the Kelvin points is added to the resistance measurement of the device-under-test. The diagram below shows how the location of the Kelvin points will affect the resistance measurement of the device-under-test.



DUT #1:
The measurement is only of the device-under-test. This is ideal, but in real situations; it may be nearly impossible.

DUT #2:
The measurement includes part of the fixture. **Warning!** If a lot of the fixture is between a Kelvin point and the device-under-test, the 4-Wire Test will be considerably compromised.

DUT #3:
The measurement tests only part of the device-under-test. For example, by using probe pins, you can eliminate the resistance of a connector from the measurement.

Turning 4-Wire Testing on in the Tester

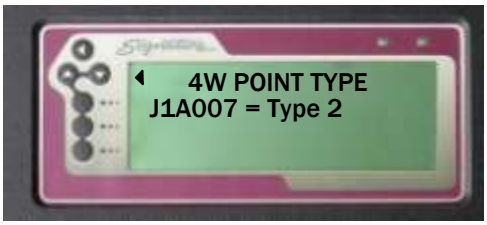
Before learning a 4-wire fixture and tested assembly, you must turn on the 4-wire capability in the **Set Lrn Components** menu.

1. From the main menu, press **Set Up Test Program.**
2. Press **Create New Test.**
3. Press **Set Learn Settings.**
4. Press **Set Components.**
5. Scroll down, ▼ and press **4W Kelvin.**

Probing for Test Points Type

With 4-Wire testing turned on, you can probe a test point to determine whether it is a type 1 or a type 2 test point. When you probe a point, the probe type displays as shown.

1. From the main menu, press **Set Up Test Program.**
2. Press **Create New Test.**
3. Press **LEARN.**
4. Scroll down, ▼ and press **Probe 4W Point Type.**



Learning a 4-Wire Test Setup

Now you can learn a 4-wire test. First learn the fixture, and then learn the tested device.

1. From the main menu, press **Set Up Test Program.**
2. Press **Create New Test.**
3. Press **Learn.**
4. Make sure *only* the 4-wire fixture is connected; press **Continue** to learn the fixture.

Note: Be sure to turn off the 4W Kelvin setting after learning a 4-wire test. This will prevent problems when learning a 2-wire resistance setup.

Connect the assembly to be tested, and press **Continue** to learn the wiring pattern of the sample tested assembly.

The tester should make a sound indicating that the assembly has been learned.
The screen will display CABLE LEARNED.

Cable Error Messages

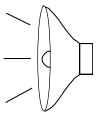
When an error is found in a tested cable, the screen displays a cable error message. The four cable error message types are: **Low Voltage, Component, High Voltage,** and **Intermittent.**

When a tested cable has an error:

The tester displays the type of test error on the screen.

The red LED turns on.

Error tones sound based on the type of error.

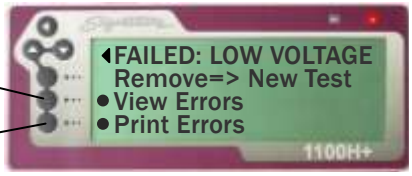


To see the detailed cable error message:

Press **View Errors** and scroll down ▼ to see the whole page,

or

Press **Print Errors** if a printer is connected.

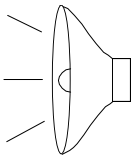


The detailed error message shows the **Error Signature** and the specific error or errors found (in this case, a short to Net 1).

Error Tones

When the tester finds a cable error, it makes error tones based on the type of error:

Opens = single beeps
Shorts = double beeps
Miswires = triple beeps
High voltage errors = triple beeps



Error tones give the operator instant feedback if there is a problem. For instructions on changing speaker volume, see **Changing the Speaker Volume** on page 10 and Changing Volume and Display Controls on page 86.

Low Voltage Errors

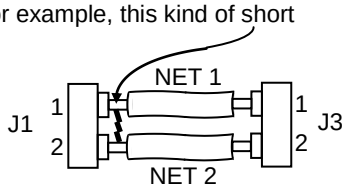
Low voltage errors identify errors in the cable wire pattern.

Shorts

The tester displays SHORT if it senses an interconnection that should *not* exist in the cable. There are two kinds of short errors:

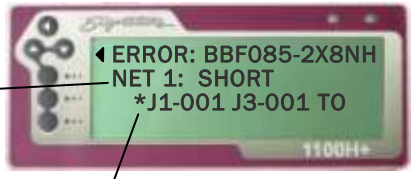
1. Shorts that occur between nets that exist in the net list.

For example, this kind of short



would be detailed like this.

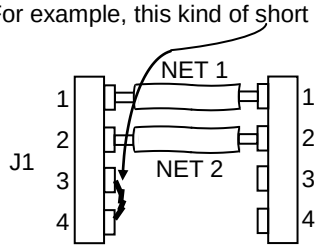
If the User Preference **Fault Location** were turned on, the short above would be displayed like this.



An asterisk is added to the pin closest to the short. The tester does this using resistance measurements.

2. Shorts that occur between points not used in the net list.

For example, this kind of short



would be detailed like this.

A NET NC SHORT indicates a short exists between two No Connect pins, or between a net and a No Connect pin.

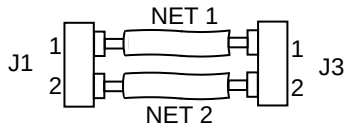
Shorts are caused by:

- Defects in the cable such as frayed wire strains, bridging solder joints, or conductive contaminates between exposed connections.
- The **LV Insulation Resistance** setting being set above the actual resistance of the insulation between nets; therefore, nets leaking into each other appear as shorts.

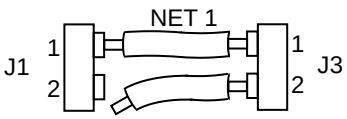
Opens

The tester displays OPEN if it does *not* sense an interconnection that should exist in the cable.

For example, if this is correct

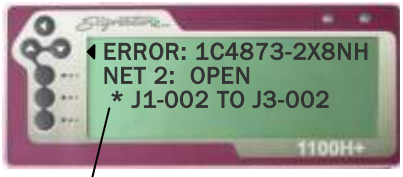


and this was the error,



the error would display like this.

If the User Preference **Fault Location** were turned on, the open above would be displayed like this.



An asterisk is added to the pin closest to the open. The tester can do this by sensing the lower capacitance of the unconnected pin.

Opens are caused by:

- Defects in the cable, such as missing or cut wires, defective or un-inserted connector contacts, and cold solder joints.

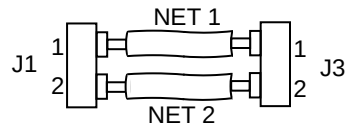
Additionally, the tester could display an open error when:

- The **LV Insulation Resistance** setting is lower than the actual resistance of a wire connection.
- The **Component Resistance** setting is lower than an electronic component in the cable.

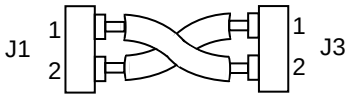
Miswires

The tester displays MISWIRE if it senses that a contact, which should have a valid connection, is connected to an incorrect contact.

For example, if this is correct



and these were the errors,



the error message would look like this.

As shown in this example, the miswire error is indicated as a contact OPEN to where it *should* go, and MISWIRE to where it *does* go.

Miswires are caused by:

- ❑ Wiring errors in the cable.

High Resistance

The tester displays a **High Resistance** error when a cable interconnection has too much resistance.

High Resistance errors are caused by:

- ❑ Defects in the cable, such as partially inserted or dirty connector contacts and poorly crimped wires.
- ❑ High resistance in the adapter or tester connector contacts. In this case, the tester connectors that interface with the adapters may be worn or damaged and need to be replaced.
- ❑ A **Connection Resistance** setting too low for the tested assembly. In this case, the resistance of a wire or contact is greater than the **Connection Resistance** setting, but less than the **LV Insulation Resistance** setting.
- ❑ A component, such as a resistor, exists in the cable which has not been learned in the test program.

Intermittent Errors

The 1100H+ looks for intermittent errors in a cable during the **Intermittent Test.** Intermittent errors include the *same* short and open errors found in the low voltage test, as described in the previous section.

What's the difference between Intermittent Errors and Low Voltage Errors?

To be an **Intermittent Error,** the tester must sense that the cable wire pattern:

1. Was good,
2. Then changed to bad,
3. Then changed back to good.

Intermittent Errors are caused by:

- Cable defects that show up only when the cable is moved or wiggled during the test.
- The same as those described in the previous section for opens and shorts.

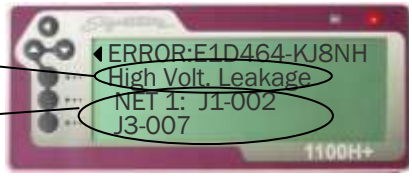
High Voltage (Hipot) Errors

Failed hipot errors occur during the high voltage test.

Like other error messages, press **View & Print Errors,** to see the detailed error message.

For example, this message for a hipot failure describes:

1. The type of hipot failure
   AND
2. Which net or test point failed.



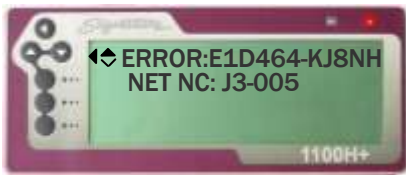
Note: The High Voltage error message does *not* show what the error was to, only that it happened from the displayed net.

For example, the error message shows two hipot errors; therefore, we assume these two points were arcing to each other (NET NC means the error occurred on an unconnected point in the connector).

First Detail Error Screen

If more than two hipot errors occur, you cannot assume which points were leaking or arcing to each other.

Second Detail Error Screen



Overcurrent Errors

An overcurrent error indicates that the tester could not supply enough current to raise a net (or point) to the selected hipot test voltage.

Overcurrent Errors are caused by:

- A high resistance “short.”
- A net with too much capacitance to be raised up to full hipot voltage. In this case, you may need to adjust the **High Voltage** setting, or turn the **High Cap Shield Allowed** setting to “Yes.”
- The **LV Insulation Resistance** setting is set so low the tester could not sense a “near short”.
- You’ve re-run the hipot test on a cable that produced a dielectric failure. Occasionally, the high voltage arc that caused the dielectric failure creates a conductive carbon trail, which causes the cable to fail subsequent tests.

Dielectric Failure

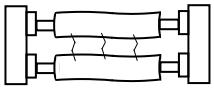
This error occurs when high voltage is applied to a cable connection, and the tester detects a current spike caused by the discharge of a high voltage arc.

Dielectric Failures are caused by:

- Exposed cable connections, too close to each other, which may be related to damaged insulation, or terminal spacing problems.
- Contaminants, or condensed moisture, on a surface between exposed cable connections, which create an electrically conductive path that “breaks down” in high voltage. Surface contamination typically produces a **High Volt. Leakage** error.
- The **Hipot Voltage** setting being too high for the tested cable or adapters used for the test.

High Volt. Leakage

This error occurs when high voltage is applied to a cable connection, and the tester detects current flow from the connection. This indicates the resistance of cable insulation is less than the **Insulation Resistance** setting.

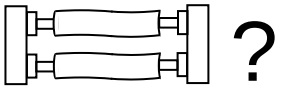


High Volt. Leakage Errors are caused by:

- Contamination on cable connectors or wires, which form an electrically conductive path allowing some current to flow.
- Wire insulation, or connector housings, loses some insulating value by absorbing moisture from the environment.
- The insulating- material-under- test has been incorrectly specified.

Dielectric Failure On Unknown Point

This error occurs when the tester finds a dielectric failure (a high voltage arc) when hipotting a cable with the **High Speed Hipot** setting turned ON. To locate the error, the tester automatically changes out of the **High Speed Hipot** algorithm, but cannot locate the error. This error is rare. If it occurs repeatedly, turning the **High Speed Hipot** setting OFF will allow you to catch arcs that occur only once.



User Aborted Hipot

Indicates that the operator pressed ABORT before the hipot cable test finished.

Component Errors

The tester displays a component error if it senses a problem with an electrical component programmed into the cable test. The tester detects component errors during the Low Voltage cable test.

Bad Resistor and Bad Capacitor

The tester displays these messages when it senses a component with a measured value outside the tolerance for the component programmed in the cable test.

Possible causes:

- The wrong value component is installed in the cable.
- The correct component is installed, but is out of tolerance.
- The connection to the component has high resistance and therefore, has affected the tester's ability to correctly measure the component value.

Missing Resistor, Missing Capacitor, and Missing Diode

The tester displays these messages when it does not sense a component where it should be in the cable.

Possible causes:

- A connection to the component is open.
- The component has not been installed, is missing, or has a value greater than what the tester can measure.

Bad Diode

The tester displays this message when it senses a defective diode condition.

Possible causes:

- The diode's forward or reverse bias voltage drop is out of tolerance.
- The installed diode is outside the measurement capability of the tester.

Reversed Diode

The tester displays this message when it senses a diode's orientation is reversed.

Possible cause:

- The diode is reversed in the cable.

NOT twisted

- Two wires are not twisted that should be.

No twisted-pairs

- The tester did not detect twisted-pairs in the tested cable.

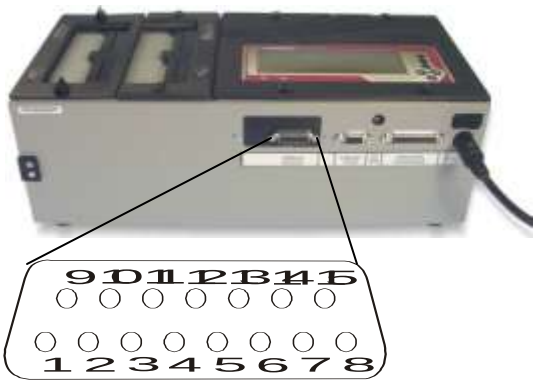
Wires are paired incorrectly

- A wire is twisted with the wrong wire.

Digital I/O on the 1100H+

Digital I/O allows you to set up the 1100H+ to control external devices with tester functions. You can also use an input on the tester to start a test. For example, the tester could be built into a cabinet that does not allow the operator to access the display. By using **External Switch** input, you can allow the operator to start a test with a switch on the outside of the cabinet. Additionally, if the cable doesn't pass the test, you can use two of the tester's outputs to activate a buzzer and a red light.

The digital I/O port is located on the back of the tester. The location and pin out of the connector are as shown.



The table below shows each of the signals on the digital I/O port.

Pin	Explanation
1	Input External Switch
2	Input Hipot Safety Switch
3	Input
4	Input
5	Output
6	Output
7	Output
8	Output
9	Power + 5 VDC, 100 mA max.
10	Output
11	Output
12	Power + 10 VDC, 100 mA max.
13	Not used
14	Ground
15	Ground

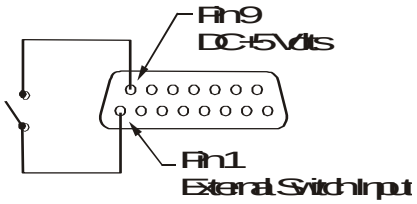
Inputs

The 1100H+ tester has four inputs. VDC logic is typically used to control an input; however, any VDC up to a nominal 24 volts may be used. Inputs used for the tester's **External Switch** and **Hipot Safety Switch** capability are described below. If needed, other inputs can be assigned by using the Scripting option.

External Switch

The 1100H+ has the ability to start a test based on input from an external switch, such as a foot pedal or sensor in automated test equipment. To use the **External Switch** input, you must set the User Preference **External Switch** to YES. For more information, see **External Switch** on page 39.

The **External Switch** input is on pin 1 of the digital I/O connector. If a DC +5 volt (logic high) is applied to pin 1, the tester behaves as if START TEST were pressed. You can use the DC +5 volts power source on the digital I/O connector to supply the DC +5 voltages through the switch circuit as shown below. Do not apply an AC voltage to the input.



Hipot Safety Switch

The 1100H+ allows you to start the hipot test by closing an external hipot safety switch. The safety switch might be dual palm switches wired in series, a foot pedal, or a sensor in automated test equipment. To use **Hipot Safety Switch** input you need to first, set the User Preference **Safety Switch** to ON. For more information, see **Safety Switch** on page 42.

The **Hipot Safety Switch** input is on pin 2 of the digital I/O connector. If a VDC +5 (logic high) is applied to pin 2, the tester allows the hipot test to proceed. You can use the VDC +5 power source on the digital I/O connector to supply the VDC +5 through the switch circuit. Do not apply a VAC to the input. The schematic above shows how a safety switch could be wired and for the safety switch use pin 2 instead of pin 1.

Outputs

The tester's outputs are "sink" outputs. When activated they will connect (or sink) a voltage to ground, in effect turning ON the output circuit. The outputs are capable of sinking up to a nominal 24 volts and 500 milliamps. To limit the output current, always ensure adequate resistance between power supply and the output. When switching a voltage between 12 and 24 volts, the output will allow a slight current flow (about 1mA at 24 volts) when the output is OFF.

Current cannot flow when the normal state of each output is off. Using the **Digital Outputs** settings in the User Preferences tester interface, you can set up test events to turn an output ON or OFF. One test event sinks the output to ground, thereby allowing current flow through the output circuit. A second event resets the output line to its original OFF state. If you select the same event to set and reset the output, the tester will sink the output for a 10 millisecond pulse. For step-by-step instructions on setting up **Digital Outputs,** see **Setting up the Events Outputs** on page 78.

Each of the test events that change output status are listed below.

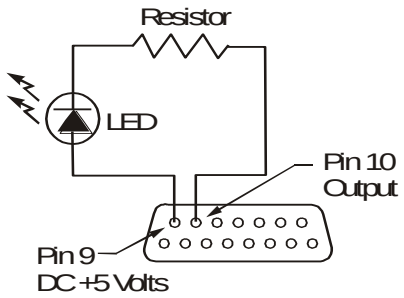
Test Event Name	Description
Bad Light Off	The front panel "Bad" light is off.
Bad Light On	The front panel "Bad" light is on.
Cable Attached	The tester sensed a connection between 2 or more test points.
Cable Counted Bad	The tester counted a cable "bad" in the test summary.
Cable Counted Good	The tester counted a cable "good" in the test summary.
Cable Removed	The tester sensed the cable is removed.
Count Intermittent	The tester counted a cable "intermittent" in the test summary.
Failed Self Test	The tester failed self-test when turned on.
Good Light On	The front panel "Good" light is on.
Good Light Off	The front panel "Good" light is off.
HV Delay Started	The tester started the delay before the HV test.
HV Test Delay Done	The tester completed the delay before the HV test.
HV Test Done (P/F)	The tester completed the high voltage test with either pass or fail.
HV Test Failed	The high-voltage test failed.
HV Test Passed	The high-voltage test passed.
HV Test Started	The tester started the high-voltage test.
HV Test Aborted	The tester aborted during the hipot test.
Is Intermittent	The tester detected an intermittent error in the DUT.
Learn Completed	The tester completed the cable learn process.
Learn Started	The tester began the cable learn process.
LV Test Done (P/F)	The tester completed the low-voltage test with either pass or fail.

LV Test Failed	The low-voltage test failed.
LV Test Passed	The low-voltage test passed.
LV Test Started	The tester started the low-voltage test.
Ready to Test	The tester is ready to test; the cable may or may not be attached.
Will Count Good	If the cable were removed, it would count as “Good”.
Will Count Bad	If the cable were removed, it would count as “Bad”.

Output Examples

Controlling an LED
Let’s say you want to light an LED to warn the operator during the hipot test. In the User Preference **Set Digital Output,** you can choose to configure one of the outputs. In this case, choose output pin 10. For this output pin, select **HV Test Started** to set, and **HV Test Done (P/F)** to reset the output.

In this example, the LED requires only 20 mA, so we can use the +5 DC volt supply on the digital I/O port to power our circuit. Use a resistor in series with the LED to limit the current going through it.

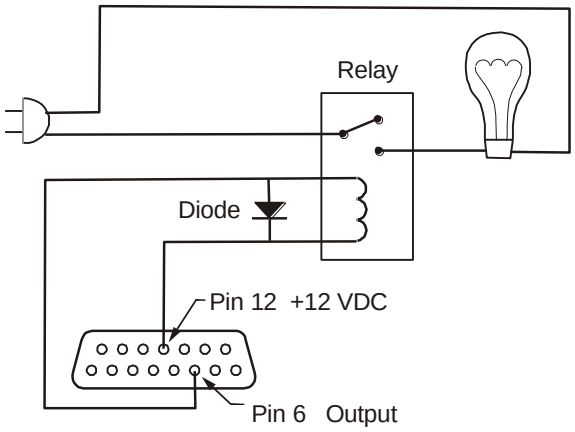


How do you choose the resistor? The LED in this instance has a forward bias voltage drop of two volts; therefore, three volts must drop across the current limiting resistor. Knowing voltage drop and current through the circuit, Ohms Law can be used to determine the resistor value.

When the hipot test starts, the tester will pull the output to ground allowing current to flow in the circuit, and the LED will turn on. When the hipot test completes, current through the output will stop, and the LED will turn off.

Turning on a Light Bulb

Let's say instead of an LED, you want to turn on a light bulb powered from a 120 VAC wall outlet; a relay can be used to control the light bulb. In this example, we select a relay that has a coil voltage of 12 volts and draws less than 100 milliamps so we can use the +12 volt DC power supply on the tester. The relay circuit is as shown.



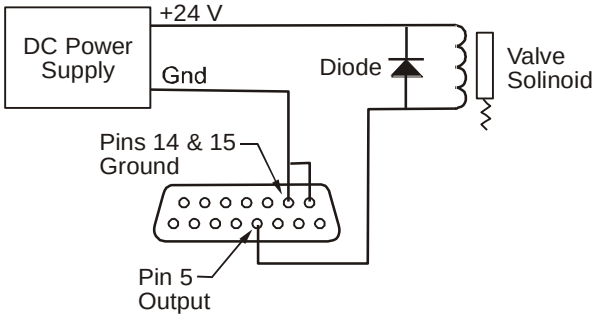
A diode, such as a 1N4002, is added across the relay to protect the digital I/O port from the reverse current created from the coil when the output turns off.

Activating an Air Valve

Let's say you want to control an air valve for equipment that will automatically stamp "tested good" on each assembly that passes a test. In the User Preference **Set Digital Output,** you can select **Cable Counted Good** to both set and reset the output. Remember, if the same event is selected for set and reset, the tester will sink the output for a 10-millisecond pulse. In this case, a pulse is all we need to make our stamp mechanism function.

In this example, the solenoid for the air piston requires DC 24 volts and 300 milliamps (the coil resistance is 80 ohms).

Note: The digital I/O port can only supply 100 milliamps at either DC 5 or 10 volts; however, the output can sink up to 24 DC volts. In this case, you can use an external power supply for the valve circuit as shown below.



In this example, a 1N4002 is added across the relay to protect the digital I/O port from the reverse current created from the coil when the output turns off.

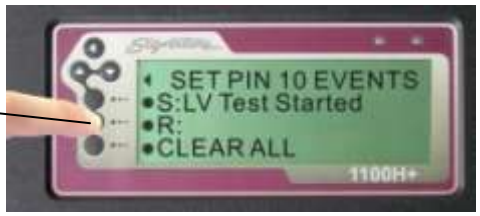
Setting up the Events Outputs

The 1100H+ has six outputs that can drive an external device according to various “events” in the tester. These events occur as the tester powers up, learns a cable, tests a cable, and displays the test results. Controlling an output line requires two triggering events.

1. From main menu, press **Set Preferences.**
2. Scroll down ▼ and press **Set Digital Output.**
3. Scroll up or down ▲▼ to the digital output pin you want to set up.
4. Press **S** (set).

The S event sets (or sinks) the output pin to ground thereby allowing current to flow through the output circuit.

5. Scroll up or down ▲▼ to the test event needed to start the operation of the output device; press **Accept.**
6. Press **R** (reset).



The R event resets the output pin to the original no current flowing state.

7. Scroll up or down ▲▼ to the event needed to stop the operation of the output device; press **Accept.**
8. Press back ◄ to return from the **Digital Output** selection menu.

Note: Two of the outputs are factory enabled with default triggers. The pin 7 output is set with **Good Light On** and reset with **Good Light Off.** Pin 8 is set with **Bad Light On** and reset with **Bad Light Off.**

1100 Upgrade Application

The **1100 Upgrade Application** allows you to update the tester software and change the interface language of the tester. English and Spanish are now available for the1100H+ tester. Other languages may be available in the future.

To update the software and select an interface language, you need to obtain a file containing the **1100 Upgrade Application** and the current 1100 tester software. You can access this file from the Cirris FTP site, or it can be emailed or mailed to you. You will need a computer that can provide a serial interface for your tester. If you do not have a computer with a serial port, you may use a USB port with a Cirris qualified Keyspan USB-to-serial adapter. A serial cable is provided with the CTLWIN kit you received with the tester.

To download the upgrade file from the Cirris FTP site:

1. Type the URL **ftp://ftp.cirris.com/1100** in your web browser.
2. Double click on the file **1100_verx.xx.exe,** where the x.xx is the current revision.
3. In the **File Download** dialogue box that comes up, click **Run** to install the **1100 Upgrade** software, or click **Save** if you will be installing the software on other stations.

   The software installation should take a few seconds. When the software is installed, an **1100 Upgrade** utility icon will appear on the computer desktop.

To run the 1100 Upgrade Application:

With the tester turned ON and connected to the computer, double click the **1100 Upgrade Utility** icon. In the **Download Utility** screen, select a language and click **Download.** When the download is complete the tester will reboot with the selected language and updated software.

1100 Utilities Application

The **1100 Utilities Application** has two tabs. The **Security Manager** tab allows you to lock or unlock specific tester menu selections. The **Option Manager** tab allows you to enable additionally purchased options, such as scripting, AC, and SPC Data Collection.

The computer you connect to the tester must have a serial port or use a USB-to-serial adapter. Cirris has qualified the Keyspan USB-to-serial adapter; other adapters may work correctly. You can purchase this adapter from a local distributor or from Cirris. You must install the **1100 Utilities** software on a computer. This software can be downloaded from the Cirris FTP site. Additionally, to utilize this feature, the tester must have version 4.5a software or higher installed.

To download and install the 1100 Utilities software:

1. Type the URL **ftp://ftp.cirris.com/1100** in your web browser.
2. Double click on the file **1100_utilities1.0.exe.**
3. In the **File Download** dialogue box, click **Run** to install **1100 Utilities,** or click **Save** if you will be installing the software on other stations.

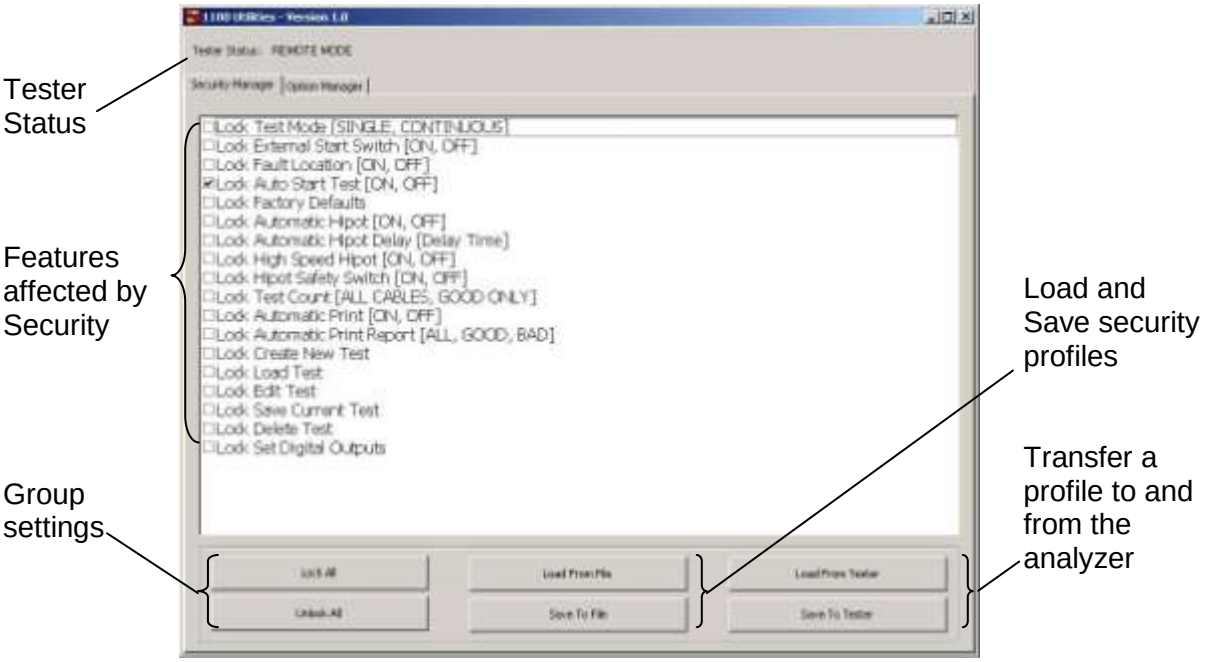
   The software installation should take a few seconds. When the software is installed, an **1100 Utilities** icon will appear on your computer desktop.

To run the 1100 Utilities software:

1. You received a serial cable in the CTLWIN kit that came with your tester. Connect this cable between the serial interface of your computer and the tester.
2. Turn on the tester.
3. Double-click the **1100 Utilities** icon on the desktop. When the **1100 Utilities** software establishes communication with the tester, the tester displays REMOTE.

The Security Manager tab

When the **1100 Utilities Application** opens, the **Security Manager** tab is active. The boxes with a check mark indicate the active security settings that exist in the tester.



To change the security settings:

1. Select or deselect the checkboxes to adjust the security to the desired settings.

2. Click **Save To Tester.**

If you want to review the settings that have been saved to the tester, click **Load From Tester.**

If would like to duplicate the security settings later, click **Save To File** to save the setting information on the computer you are using. Click **Load From File** to access previously saved security settings.

The Option Manager tab

When you click the **Option Manager** tab, you can see the tester serial number recorded in the tester's hardware. To enable purchased options, enter the feature access code you obtained from Cirris when the option(s) was purchased, and click **Send To Tester.** The **Option Manager** window will update to show the enabled option under **Enabled Features.**

1100 File Compression Utility

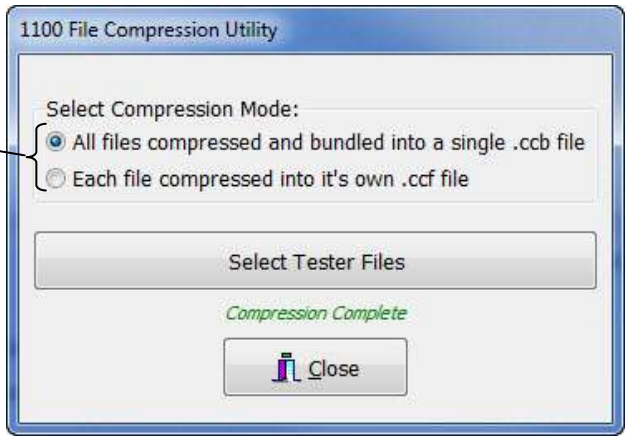
This utility allows you to compress a group of wirelists and scripts into a bundle, and copy them to the tester simultaneously via thumb drive. You can also compress individual files. Compressed files create more space in the tester's memory. Another benefit of this utility is if you copy compressed files to the tester via thumb drive, custom file names up to 16 characters will display in the tester. Without the utility, custom file names longer than 8 characters will be truncated in the tester.

Compressing the Wirelists

1. Select Windows *Start>All Programs> Cirris System Corporation>1100 Utilities* and double-click on **FileCompression1100.exe**.

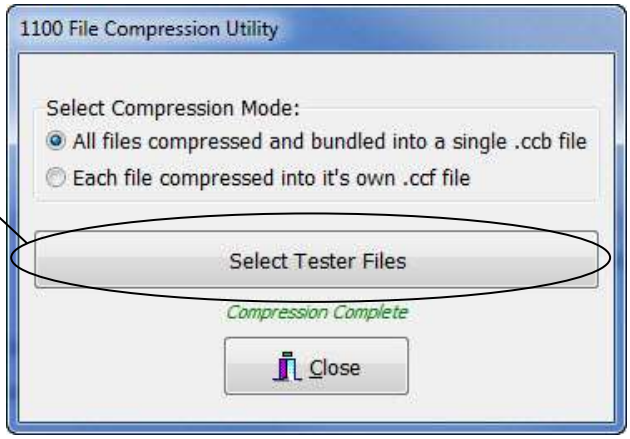
2. When the "1100 File Compression Utility" opens, select your desired Compression Mode:

   - **"All files compressed and bundled into a single .ccb file"** allows you to import multiple compressed files at one time.
   - **"Each file compressed into it's own .ccf file"** allows you to import compressed files individually.



Note: The compressed bundle file extension .ccb stands for "Cirris Compressed Bundle." The compressed single file extension .ccf stands for "Cirris Compressed File".

3. When you have made your selection, click **Select Tester Files.**



4. Browse to the location of your files.

   If you selected all files compressed and bundled into a single file, multi-select the files you want to be in the bundle and click **Open.**

   If you selected each file compressed into it's own file, **s**elect the desired file and click **Open.**

5. Insert a thumb drive into your PC and browse to the thumb drive location.

6. **If you selected all files compressed and bundled into a single file,** give the bundle of files a name a file name with the maximum of 8 characters and click **Save.**

   If you selected each file compressed into it's own file, the file name will be auto-generated. Click **Save.**

7. Transfer the thumb drive from your PC to the tester and power on the tester.

8. Import the wirelists from the thumb drive into the tester (see **Importing Compressed Wirelists/Script Files** on page 28).

SPC Data Collection

SPC stands for Statistical Process Control pertaining to a series of ways you can manage a collection of data. SPC Data Collection allows you to store the following information.

These data elements are *always* stored as part of SPC Data Collection:

- ❑ Run Number
- ❑ Analyzer Serial number
- ❑ Cable Description (if defined)
- ❑ Cable File Name
- ❑ Operator Name (if defined)
- ❑ Date and Time tested
- ❑ Signature

These data elements are stored as part of **Summary** data:

- ❑ Total Tested
- ❑ Total Good
- ❑ Total Bad
- ❑ Error Types Summary
- ❑ Custom, per group (if stored in Scripting)
- ❑ Custom, per Cable (if stored in Scripting)

These data elements are stored if **Values** is turned ON:

- ❑ Net or Instruction Label
- ❑ Net or Instruction Measurement

These data elements are stored if **Error Text** is turned ON:

- ❑ Error Number
- ❑ Error Code
- ❑ Error Type
- ❑ Error Text

Additional data elements may be stored using Scripting in conjunction with SPC Data Collection.

To use SPC Data Collection, you must, do the following:

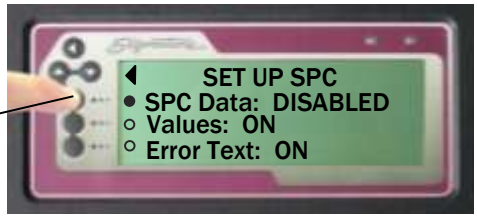
1. Activate SPC Data Collection.
2. Enable SPC Data Collection.
3. Store SPC Data by performing tests.
4. Retrieve and analyze SPC Data using SPC Link or SPC Made Easy.

Activating SPC Data Collection

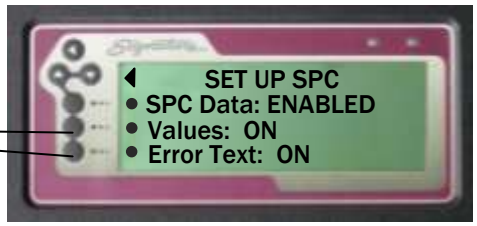
Activate through the Option Manager tab in the 1100 Utilities Application (see **1100 Utilities Application** on pages 80).

Enabling SPC Data Collection

1. From the main menu, press **Set Up Test Program.**
2. Press **EDIT.**
3. Press **Set Up SPC.**
4. Press **SPC Data** to enable SPC Data Collection.



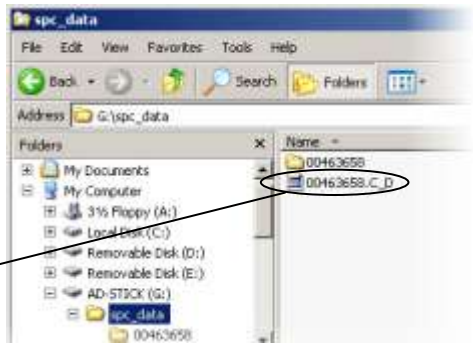
When **SPC Data** is enabled, you can select which Values and Error data you wish to be stored by turning **Values** and **Error Text** ON or OFF.



Storing SPC Data by Performing Tests

Before you can collect SPC data, you must first create a folder named **spc_data** on the root of either a thumb drive or network drive (if you are using a network drive, the **spc_data** folder must be located in the directory that you named as DIRECTORY FOR TESTER FILE STORAGE when you set up the network using Networking Made Easy)**.**

During testing, results are stored in a temporary file. When the test run is complete, you must return to the main menu for the results to be copied to the spc_data folder. The file will be given a name consisting of the tester's serial number followed by *.C_D* (i.e. If your tester serial number is 463658, the file name in the spc_data folder will be **00463658.C_D**).



Note: Subsequent runs of SPC Data will not overwrite previously stored information. Newer SPC Data will be appended to the end of the existing data file.

Retrieving and Analyzing SPC Data

Use SPC Link or SPC Made Easy.

- **SPC Link**
  Cirris SPC Data can be read and stored by the SPC Link software that comes with the SPC Data Collection package. Instructions for use are included with the PC software.

- **SPC Made Easy**
  SPC Made Easy not only reads and stores SPC Data, but it allows you to graph and chart specific data making analysis quick and easy. SPC Made Easy makes it possible for you to: look for defects, view production rates, measure efficiency, and manage data. A demonstration of SPC Made Easy can be obtained from Cirris by calling 1-800-441-9910.

Changing Volume and Display Controls

If the **Set Volume Control** in the tester's interface is inadequate, you can manually adjust the speaker volume. You can also manually adjust the display intensity.

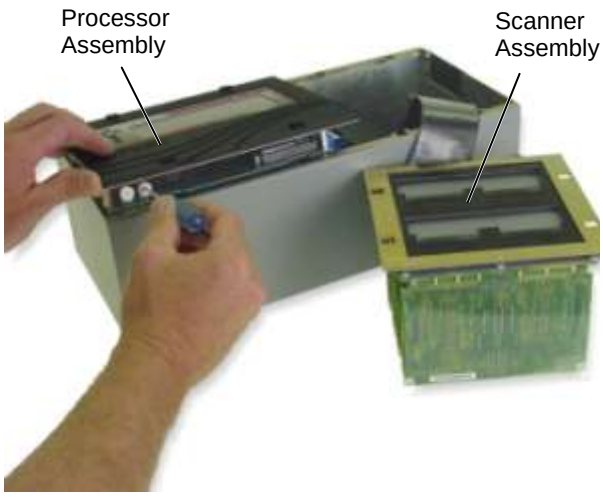
To manually adjust the speaker volume or display intensity:

1. Remove the scanner assembly from the tester (for more detailed instructions on removing a scanner, refer to **Installing Add-On** on page 6).

2. Lift the front edge of the processor assembly as shown.

3. Using a small screwdriver, adjust the speaker or display control. Each control is labeled on the PC board.

   These adjustments need to be made with the tester turned on to observe the results. If adjusting the speaker, access the speaker volume control on the display menu (see **Changing the Speaker Volume** on page 10).



Checking Version Information

You may check the 1100H+ software version, hardware version, and serial number.

1. From the main menu, scroll down.▼

2. Press **Version Information.**

   The screen will display the hardware, software, and serial number information.

General Information

Calibration

Each new 1100H+ tester comes with a complimentary certificate of calibration. Cirris recommends the tester be recalibrated on a one-year interval. In the U.S.A. Cirris offers complete calibration services in compliance with ANSI/NCSL Z540-1-1994 and MIL-STD 45662A.

To verify calibration and functionality, you can purchase the 1100H+ Performance Check Kit. The 1100H+ Performance Check kit has a valid calibration period of 5 years, after which it must be replaced. In addition to the performance check kit, you need a calibrated volt meter and high voltage probe capable of measuring the highest voltage the tester can output.

Note: In the event a Cirris tester is found to be out of calibration, there are no adjustable controls. The tester, or the affected portions, must be sent back to Cirris for repair.

Maintaining Adapters and Fixturing

The contacts on Cirris adapters, or other fixturing that mate to the device-under-test, may wear due to repeated insertion cycles. Contact wear can result in higher connection resistances, which increases the measured resistances for the tested device. For this reason, Cirris recommends customers evaluate the number of mating cycles and the cycle life of fixture contacts to determine maintenance intervals for testing and/or replacing fixturing contacts. A good way to check fixture contact resistance is to construct and use a shorting block. For more information on creating shorting blocks, see ***http://www.cirris.com/adapters/test-adapt.html.***

Service

All Cirris Testers are designed as modules for easy servicing. Should your Cirris tester require service, as directed by Cirris support personnel, you may need to send the affected module or entire tester back to Cirris for repair. During the repair period, a loaner tester can be sent to you if needed. You should not attempt to service any circuit board at the component level. All component-level service should be performed by Cirris technicians.

Conditions for Operation

Your 1100H+ tester is intended to be used indoors at a temperature of 10°C (50°F) to 40°C (104°F). Best performance can be obtained at a relative humidity less than 75%. Insulation Resistance Measurements will degrade over 75% relative humidity. The unit can be mounted in a ventilated compartment. Be sure not to block the vents on the back of the tester.

Never apply live voltages to the test points or probe input of your Cirris tester. Power supplies and other accessories not approved by Cirris may cause damage or present a hazard. If you use a Cirris product in a manner not specified in this manual and the accompanying help system, the protection provided by the product may be impaired.

Appendix

Specifications

Test Point Capacity	128 to 1024 test points expandable in 128 point increments
Test Voltage Levels	**Low voltage test:** ≤ 5VDC 6mA maximum **High voltage test:** 1000 V Unit: 50 - 1000 VDC ± 5% 1500 V Unit: 50 - 1500 VDC ± 5% AC Option with 1000 V Unit: 50 - 700 VAC ± 5% AC Option with 1500 V Unit: 50 –1000 VAC (± 5%)
Connection Resistance Sensitivity	0.1 – 100 KΩ (± 1%) ± .1Ω Also: 500KΩ, 1MΩ, 5MΩ (± 10%)
LV Insulation Resistance	0.1 - 100KΩ (± 1%) Also: 500KΩ, 1 MΩ, 5 MΩ (± 10%)
HV Insulation Resistance	5 MΩ, 10 MΩ, 20 MΩ, 50 MΩ, 100 MΩ, 200 MΩ, 500 MΩ, and 1000 MΩ (± 10%)
Kelvin Four-Wire Resistance	0.001Ω to 1 MΩ (± 2%) ± 0.001Ω. Current: 1A to 1.2Ω; 0.25A to 10Ω; <7mA above 10Ω
Dielectric Withstand Current	.1mA, .2mA, .5mA, and 1.5A
High Voltage Duration or Dwell	10 ms to 120 seconds (AC Option 1-7200 cycles)
High-voltage energy limit	35 mJoules
Test rate (typical)	**Low voltage test:** 128 test points in .25 seconds **High voltage test:** .01 – 120 seconds duration per net **High speed hipot:** User selectable
Maximum Test Points per net	128
Maximum capacitance per net	0.2μF at 300VDC, 80nF at 500VDC, 20nF at 1000VDC
Maximum cable length	**Low voltage test:** Tested at 0.6 miles **High voltage test:** Limited by the capacitance at a given voltage. Use specification for Maximum capacitance per net, and your cable's capacitance ratings to calculate possible length.
Usable humidity range	Relative humidity above 75% may adversely affect the hipot performance.

Specifications Continued

Component Specifications	**Resistor:** Learn 0.1Ω to 100 KΩ ± 1%; *Test* 0.1Ω to 1MΩ **Capacitor:** Learn 400nF to 100 μF ± 10%; *Test* 5nF to 100μF ± 10% ± 20pF (relative measurements to 10 pF) *Diode*: Learn silicon diodes, zeners; *Test* silicon diodes, zeners, and LEDs.
Twisted Pair	Paired length must be 1 to 6 feet minimum, depending on electrical characteristics of twisted pair. Cable with pairs must have a minimum of 3 wires.
Digital I/O Port	4 inputs (0-24 VDC); 6 User programmable outputs (Sink: 24 VDC, 500mA max); Source Voltages: +5VDC 100mA, +10VDC 100mA.
Parallel Port	Standard Epson/Centronics type parallel interface
Memory	Nonvolatile storage of up to 99 test programs
Power	100-250 VAC, 47-63 Hz, maximum 50 Watts
Dimensions and weight	**Main unit:** 14.25 " wide x 6.75 " deep x 5.25" high (36.2cm wide x 17.2cm deep x 13.4cm high) Weight 9.7 pounds (4.4 kilograms) **Scanner Add-On:** 6.25" wide x 6.75" deep x 5.25" high (15.9cm wide x 13.4cm deep x 13.4cm high) 6.3 pounds (Weight 2.8 kilograms)

Signature 1100H+ Warranty

Cirris Systems Corporation warrants the Signature 1100H+ Cable Analyzer to be free of defects in materials and workmanship for a period of one (1) year from the date of delivery; as evidenced by receipt of your warranty registration form. In the event a defect develops due to normal use during the warranty period, Cirris Systems Corporation will repair or replace the analyzer with a new or reconditioned unit of equal value.

In the event of replacement with a new or reconditioned model, the replacement unit will continue the warranty period of the original analyzer. The replacement unit will generally ship within one working day for domestic U.S.

If the analyzer failure results from accident, abuse, or misapplication, Cirris Systems Corporation shall have no responsibility to replace the analyzer or refund the purchase price. Defects arising from such causes will be considered a breach of this warranty. Cirris Systems Corporation is not responsible for special, incidental, or consequential damages resulting from any breach of warranty, or under any other legal theory, including lost profits, downtime, goodwill, damage to or replacement of equipment and property, and any costs of recovering materials used with the Signature 1100H+ Cable Analyzer.

ANY IMPLIED WARRANTIES ARISING OUT OF SALES OF THE SIGNATURE 1100H+ CABLE ANALYZER, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE ABOVE STATED ONE (1) YEAR PERIOD. CIRRIS SYSTEMS CORPORATION SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGE, EXPENSES, OR ECONOMIC LOSS.

Some states do not allow limitations on length of implied warranty or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

This warranty gives you specific legal rights and you may also have other legal rights, which vary from state to state.

Cirris Systems Corporation
Salt Lake City, Utah

PURCHASE DATE: _____
SERIAL NUMBER: _____

1100H+ Cable Documentation Form

Cable Signature: _____

Cable Description: _____

Adapter Signature(s):

J1	J9	J17	J25
J2	J10	J18	J26
J3	J11	J19	J27
J4	J12	J20	J28
J5	J13	J21	J29
J6	J14	J22	J30
J7	J15	J23	J31
J8	J16	J24	J32

Test Parameter Settings:

Connection Resistance Threshold: _____

Component Resistance Threshold: _____

LV Insulation Resistance Threshold: _____

High Voltage: _____

HV Insulation Resistance Threshold: _____

Duration: _____

Apply Hipot To: All Adapter Pins Connections Only

Max Soak: _____

High Capacitance Shield: Yes No

Connections:

Net	Test Points

Connections continued:

Net	Test Points

Components:

Notes:

1100H+ Test Program Location Listing

Unit Serial Number: _____

Drive	Folder	Mem. Loc.	Part Number	Cable Description	Cable Signature/ File Name

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Cable/Harness testing made easy®